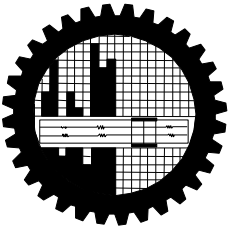


Bangladesh **U**niversity of
Engineering and **T**echnology

UNDERGRADUATE COURSE CURRICULUM

Sixth Edition

Department of Industrial and Production Engineering
2022

Contact

Head, Department of Industrial and Production Engineering (IPE), Bangladesh University of Engineering and Technology (BUET), Dhaka-1000, Bangladesh.
Telefax: +88-02-9665611
PABX: +88-02-9665650-56 Ext. 7172, 7374
Email: headipe@ipe.buet.ac.bd

Published by

Department of Industrial and Production Engineering
Bangladesh University of Engineering and Technology
Dhaka 1000, Bangladesh.

Cover Page

Designed by**:** Md. Rezwan Mahbub

Editorial Committee:
(For the new syllabus)

Dr. Abdullahil Azeem, Professor
Tahera Yesmin, Assistant Professor

Versions of the Publication:

Previous Edition: Fifth
(January, 2022)
Head of the Department:
Dr. Ferdous Sarwar

Current Edition: Sixth
(August, 2022)
Head of the Department:
Dr. Ferdous Sarwar

DISCLAIMER

The Department of Industrial and Production Engineering (IPE) and Bangladesh University of Engineering and Technology (BUET) reserve the right to make, at any time without notice, changes in and addition to programs, courses, regulations, conditions governing the conduct of students, requirements for degrees, fees and any other information or statement contained in this booklet. In case of any anomaly, the rules and regulations published by BUET in its booklet 'RULES AND REGULATIONS FOR COURSE SYSTEM' and changes subsequently made to it will prevail. No responsibility will be accepted by the University or the Department of Industrial and Production Engineering for hardship or expenses encountered by its students or any other person or persons because of such changes.

PREFACE

The information booklet for undergraduate students, in its fifth edition, has published the modified and updated new course curriculum for undergraduate studies of Industrial and Production Engineering in BUET. This curriculum was passed by the academic council of BUET in its 374th meeting held on 19.05.10.

This booklet attempts to incorporate most of the information that an undergraduate student of the department and his/her advisor may need to know for carrying out their academic activities.

Various aspects of the course system, in addition to their credit hour requirements, detail course outline and courses offered in different terms by the department are introduced.

As with the practice of any course system, it is likely that some of the rules and regulations mentioned in this booklet may be modified in the future. Students are, therefore, strongly advised to be in touch with their advisors regarding modifications that may be introduced.

Students may clarify any confusion regarding the contents of the booklet with their respective advisors, or any member of the department.

It is hoped that the information booklet will be of much use of the undergraduate students of the Department of Industrial & Production Engineering.

Editors

Contents

		Page
Chapter 1 Preamble		**1-5**
1.1	History of the university	1
1.2	Academic activities	2
1.3	Faculties and departments	3
1.4	University teachers and administration	4
Chapter 2 Department of Industrial and Production Engineering (IPE)		**6-16**
2.1	About the department	6
2.2	Faculty members	7
2.3	Facilities	10
2.4	Research	16
2.5	Industrial tour	16
2.6	Industrial practice	16
Chapter 3 Rules and Regulations for Course System		**17-44**
3.1	Organizational framework of the bachelor's degree programs	17
3.2	Student admission	18
3.3	Number of terms in a year	18
3.4	Course pattern and credit structure	18
3.5	Types of courses	20
3.6	Course offering and instruction	21
3.7	Departmental monitoring committee	22
3.8	Teacher student contact	22
3.9	Student advisor	22
3.10	Registration requirements	23
3.11	The grading system	27
3.12	Earned credits	29
3.13	Honors	32
3.14	Calculation of GPA	32
3.15	Student classification	33
3.16	Registration for the second and subsequent term	34
3.17	Performance evaluation	34
3.18	Academic progress, probation and suspension	35

Page

3.19 Measures for helping academically weak students 36
3.20 Special courses 37
3.21 Rules for courses offered in a short term 38
3.22 Minimum earned credit and GPA requirements for obtaining graduation 39
3.23 Time limits for completion of bachelor's degree 40
3.24 Inclusion of repeaters 40
3.25 Attendance, conduct, discipline etc. 42
3.26 Absence during term 43
3.27 Department code 43
3.28 Building abbreviation 44

Chapter 4 Course Requirements for the Degree of B.Sc. Engg. in IPE **45-50**

4.1 Introduction 45
4.2 Courses offered in different terms for B.Sc. Engg.(Industrial and Production Engineering) degree 46
4.3 List of optional courses 50

Chapter 5 Detail Outline of Undergraduate Courses **51-83**

5.1 Courses offered by the department of Industrial and Production Engineering 51
5.2 Courses offered to the IPE students by other departments 62
5.3 Optional courses for IPE students 72
5.4 Courses offered to undergraduate students of other departments 76

Chapter 6 Student Activities of the Department **84-89**

6.1 Introduction 84
6.2 Annual activities 84
6.3 Major achievements of the students 89

Chapter 1

PREAMBLE

1.1 HISTORY OF THE UNIVERSITY

Bangladesh University of Engineering and Technology abbreviated as BUET, is the oldest institution for the study of Engineering and Architecture in Bangladesh. The history of this institution dates back to the days of Dhaka Survey School which was established at Nalgola in 1876 to train surveyors for the then Government of Bengal of British India. As the years passed, the survey school was elevated into the Ahsanullah School of Engineering offering three years' Diploma courses in Civil, Electrical and Mechanical Engineering. In 1948, the school was upgraded to Ahsanullah Engineering College (at the present premises) as a faculty of Engineering under the University of Dhaka offering four years bachelor's courses in Civil, Electrical Mechanical, Chemical and Metallurgical Engineering. This was done with a view to meeting the increasing demand for engineers in the newly independent country and to expand the facilities for quicker advancement of engineering education in general. In order to create facilities for postgraduate studies and research, in particular, Ahsanullah Engineering College was upgraded to the status of a University giving a new name of East Pakistan University of Engineering and Technology in the year 1962. After independence of Bangladesh in 1971, it was renamed as Bangladesh University of Engineering and Technology (BUET).

Today about 5500 students are pursuing undergraduate and postgraduate studies in engineering, architecture, planning and science in this institution. At present, BUET has eighteen departments under five faculties and it has six institutes.

The BUET campus is in the heart of Dhaka – the capital city of Bangladesh. It has a compact campus with halls of residence within walking distances of the academic buildings. The physical expansion of the University over the last three decades has been impressive with construction of new academic buildings, auditorium complex, halls of residence etc.

1.2 ACADEMIC ACTIVITIES

Undergraduate courses in the faculty of Engineering, Civil Engineering, Electrical & Electronic Engineering and Mechanical Engineering extend over four years and lead to B.Sc. Engineering degrees in Civil Engineering, Water Resource Engineering, Electrical & Electronic Engineering, Computer Science & Engineering, Biomedical Engineering, Mechanical Engineering, Chemical Engineering, Material & Metallurgical Engineering, Naval Architecture & Marine Engineering and Industrial and Production Engineering. Undergraduate degrees in Architecture (B.Arch.) and in Urban and Regional Planning (BURP) are offered by the faculty of Architecture and Planning.

Postgraduate studies and research works are the other primary functions of the university. Most of the departments like Computer Science & Engineering, Electrical and Electronic Engineering, Chemical Engineering, Civil Engineering, Water Resource Engineering, Mechanical Engineering, Industrial and Production Engineering, Material & Metallurgical Engineering, Naval Architecture and Marine Engineering, Petroleum Engineering offer M.Sc. Engineering and M. Engg. degrees and some of these departments also have Ph.D. programs. Postgraduate degrees in Architecture (M.Arch) and in Urban and Regional Planning (MURP) are offered by the Faculty of Architecture and Planning.

In addition to its own research programs, the university also undertakes research programs sponsored by outside organizations such as UN organization, Commonwealth Foundation, UGC etc. The expertise of the university teachers and the laboratory facilities of the university are also utilized to solve problems and to provide up-to-date engineering and technological knowledge to various organizations of the country. The university is persistent in its effort to improve its research facilities, staff position and courses and curricula to meet the growing technological challenges faced by the country.

1.3 FACULTIES AND DEPARTMENTS

Faculty of Engineering

Department of Chemical Engineering	UG & PG
Department of Materials & Metallurgical Engineering	UG & PG
Department of Petroleum and Mineral Resources Engineering	PG only
Department of Glass and Ceramic Engineering	PG only
Department of Chemistry	PG only
Department of Mathematics	PG only
Department of Physics	PG only

Faculty of Civil Engineering

Department of Civil Engineering	UG & PG
Department of Water Resources Engineering	UG & PG

Faculty of Mechanical Engineering

Department of Industrial and Production Engineering	UG & PG
Department of Mechanical Engineering	UG & PG
Department of Naval Architecture & Marine Engineering	UG & PG

Faculty of Electrical and Electronic Engineering

Department of Electrical and Electronic Engineering	UG & PG
Department of Computer Science & Engineering	UG & PG
Department of Biomedical Engineering	UG & PG

Faculty of Architecture and Planning

Department of Architecture	UG & PG
Department of Urban & Regional Planning	UG & PG
Department of Humanities	No degree offered

Note : UG – Undergraduate; PG- Postgraduate

1.4 UNIVERSITY TEACHERS AND ADMINISTRATION

Vice Chancellor:	Prof. Satya Prasad Majumder
Pro-Vice Chancellor:	Prof. Dr. Abdul Jabbar Khan

List of Administrative Officers

Registrar:	Prof. Dr. Md. Forkan Uddin (Current Charge)
Controller of Examinations:	Prof. Dr. Mohammed Imamul Hassan Bhuiyan
Comptroller:	Md. Jasim Uddin Akond, FCMA
Director of Students Welfare:	Prof. Dr. Md. Mizanur Rahman
Director, Advisory, Extension & Research Services:	Prof. Dr. Md. Abdus Salam Akanda
Director, Bureau of Research, Testing & Consultation:	Prof. Dr. Ishtiaque Ahmed
Librarian:	Prof. Dr. Samia Subrina (Current Charge)

Deans of Faculties

Dean of Chemical and Materials Engineering:	Prof. Dr. Mohammad Tamim
Dean of Science	Prof. Dr. Md. Abdur Rashid
Dean of Civil Engineering:	Prof. Dr. Abu Siddique
Dean of Mechanical Engineering:	Prof. Dr. Md. Ehsan
Dean of Electrical & Electronic Engineering:	Dr. Quazi Deen Mohd Khosru
Dean of Architecture & Planning:	Prof. Dr. Ishrat Islam

Provosts of Residential Halls

Provost, Ahsanullah Hall :	Prof. Dr. Md. Rafi Uddin
Provost, Sabekun Nahar Sony Hall:	Prof. Dr. Fahmida Gulshan
Provost, Dr. M.A. Rashid Hall :	Prof. Dr. Syed Mithun Ali
Provost, Nazrul Islam Hall :	Prof. Dr. Md. Abdul Alim
Provost, Shahid Smrity Hall :	Prof. Dr. Md. Mostafa Ali
Provost, Sher-e-Bangla Hall :	Prof. Dr. Md. Shakhawat Hossain Firoz

Provost, Suhrawardy Hall:	Prof. Dr. Mohammad Al Amin Siddique
Provost, Titumir Hall :	Prof. Dr. Mohammad Abu Sayem Karal
Provost, Bangamata Sheikh Fojilatunnesa Mujib Hall:	Prof. Dr. Rowshan Mamtaz

Chapter 2

DEPARTMENT OF INDUSTRIAL AND PRODUCTION ENGINEERING (IPE)

2.1 ABOUT THE DEPARTMENT

In Bangladesh, the esteemed arena of Industrial and Production Engineering (IPE) emanated from BUET in 1981 as a post graduate program. Full-fledged undergraduate program started through the establishment of the department of IPE in 1997. The students, teachers and graduates of the department have worked in concert to flourish IPE as a field of great potential. Presently, the department of IPE, BUET, offers both undergraduate and graduate programs in IPE. The graduate programs are offered in two fields- IPE and AEM (Advanced Engineering Management). At present the degrees offered by the department are:

- B. Sc. in Industrial and Production Engineering
- M. Sc. in Industrial and Production Engineering
- Master of Industrial and Production Engineering
- M. Sc. in Advanced Engineering Management
- Master of Advanced Engineering Management
- Doctor of Philosophy

What the department of IPE offers is simply a qualification at its best. The department is rich in resources like library and laboratories, which are necessary for the development and nourishment of skills necessary of an engineer working in industrial scenarios. The department also makes a continuous and conscious effort to bridge the gap between the industries of the country and the department. Education in IPE is very much leaned to practical situations and it is not possible to acquire proper knowledge in this field without sufficient exposure to industrial environment. For this reason, industrial attachment is taken as a compulsory credit course for the third year students of the department. The relationship of the department with the local industries is further strengthened through

various programs such as seminars, conferences, trainings and yearly events.

2.2 FACULTY MEMBERS

Active Faculty Members

Professor and Head

Dr. Ferdous Sarwar: B.Sc. Engg. (IPE), M.Sc. Engg. (Bangladesh), Ph.D. (USA).

Professors

Dr. Nikhil Ranjan Dhar: B.Sc. Engg. (Mech), M.Sc. Engg. (Bangladesh), M.Ed. (England), Ph.D. (India).

Dr. Md. Ahsan Akhtar Hasin: B.Sc. Engg. (E.E.E), M. Engg. (Thailand), Ph.D. (Thailand).

Dr. A.K.M. Masud: B.Sc. Engg. (Mech.), M. Engg. (Japan), Ph.D. (Japan).

Dr. Abdullahil Azeem: B.Sc. Engg. (Mech.), M. Engg. (Thailand), Ph.D. (Canada).

Dr. Sultana Parveen: B.Sc. Engg. (Mech.), M.Sc. Engg. (Bangladesh), Ph.D. (Bangladesh).

Dr. Nafis Ahmad: B.Sc. Engg. (Mech.), M.Sc. Engg. (Bangladesh), Ph.D. (Japan).

Dr. Kais Bin Zaman: B.Sc. Engg. (IPE), M.Sc. Engg. (Bangladesh), Ph.D. (USA).

Dr. Ferdous Sarwar: B.Sc. Engg. (IPE), M.Sc. Engg. (Bangladesh), Ph.D. (USA).

Dr. Syed Mithun Ali: B.Sc. Engg. (IPE), M.Sc. Engg. (Bangladesh), Ph.D. (Japan).

Associate Professors

Dr. Shuva Ghosh: B.Sc. Engg. (IPE), M.Sc. Engg. (Bangladesh), Ph.D. (USA).

Assistant Professors

Dr. Prianka Binte Zaman: B.Sc. Engg. (IPE), M.Sc. Engg. (Bangladesh), Ph.D. (Bangladesh).

Dr. A. B. M. Mainul Bari: B.Sc. Engg. (IPE), M.Sc. Engg. (Bangladesh), Ph.D. (USA).

Dr. Ridwan Al Aziz: B.Sc. Engg. (IPE), M.Sc. Engg. (Bangladesh), Ph.D. (USA).

Dr. Nafisa Mahbub: B.Sc. Engg. (IPE), M.Sc. Engg. (Bangladesh), Ph.D. (USA).

Lecturers

Sidratul Muntaha Akash: B.Sc. Engg. (IPE), M.Sc. Engg. (Bangladesh) [Ongoing].

R. M. Shahbab: B.Sc. Engg. (IPE), M.Sc. Engg. (Bangladesh) [Ongoing].

Md. Galib An- Noor Amio: B.Sc. Engg. (IPE), M.Sc. Engg. (Bangladesh) [Ongoing].

Faculty Members on Leave

Assistant Professors

Md. Shahriar Jahan Hossain: B.Sc. Engg. (IPE), M.Sc. Engg. (Bangladesh).

Tanveer Hossain Bhuiyan: B.Sc. Engg. (IPE), M.Sc. Engg. (Bangladesh).

Shourav Ahmed: B.Sc. Engg. (IPE), M.Sc. Engg. (Bangladesh).

Md. Gulam Kibria: B.Sc. Engg. (IPE), M.Sc. Engg. (Bangladesh).

Shibshankar Dey: B.Sc. Engg. (IPE), M.Sc. Engg. (Bangladesh).

Tanvir Ibna Kaisar: B.Sc. Engg. (IPE), M.Sc. Engg. (Bangladesh).

Nazmul Hasan: B.Sc. Engg. (IPE), M.Sc. Engg. (Bangladesh).

Amirul Islam Saimon: B.Sc. Engg. (IPE), M.Sc. Engg. (Bangladesh).

Lecturers

Nafisa Mahbub: B.Sc. Engg. (IPE), M.Sc. Engg. (Bangladesh).

Bijoy Dripta Barua Chowdhury: B.Sc. Engg. (IPE), M.Sc. Engg. (Bangladesh).

Himangshu Kumar Paul: B.Sc. Engg. (IPE), M.Sc. Engg. (Bangladesh).

Pramiti Sarker: B.Sc. Engg. (IPE), M.Sc. Engg. (Bangladesh).

Tavila Sharmin: B.Sc. Engg. (IPE), M.Sc. Engg. (Bangladesh).

Nowsheen Sharmili: B.Sc. Engg. (IPE), M.Sc. Engg. (Bangladesh).

2.3 FACILITIES

2.3.1 Library

The department library has good collection of books in the areas of industrial engineering, production engineering and management. There are also a great number of handbooks, journals and periodicals present in the library. Copies of graduate thesis works as well as undergraduate thesis works conducted in the department are kept in the library. The library room can accommodate approximately 20 students at a time to provide reading facilities.

2.3.2 Laboratories

Department of IPE is rich in lab facilities to make the students familiar with the real world application. The students learn how to manufacture a part using CNC machine check the quality through advanced measurement techniques with Co-ordinate Measuring Machine (CMM). They also get to familiarize with the automation techniques like PLC and Robot. Material movement in the process can be understood using different types of conveyors and elevators. On the other hand, they also learn the latest simulation and CAD software like CATIA, Master CAM, MATLAB/Simulink, Solid Works, Matlab, Ansys, COMSOL etc. It is not just the design, they also learn the practical use which makes them ready not less than any experts in the job field where the excellence that only matters.

Machine Tool Laboratory

For any discrete manufacturing practice, in piece or batch production, machine tools are indispensable. The laboratory serves the students in acquiring profound knowledge about different types of machines and manufacturing processes. The machine tools laboratory is equipped with machine tools such as CNC Lathe, Injection Molding, Engine Lathe, Shaper, Milling, Surface Grinding, Turret Lathe, Drill and Gear Shaper.

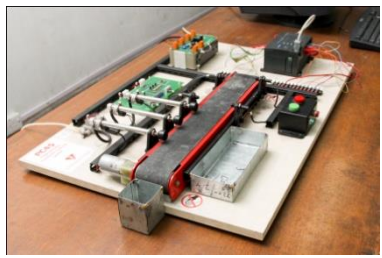
Metrology Laboratory

The Metrology Laboratory serves the students in acquiring profound knowledge of different measuring instruments and measurement processes. They also work with real life case study on quality control like sampling and finding the most crucial quality factors in a manufacturing environment. The laboratory is equipped with most advanced prototypes and measuring equipments like Co-ordinate Measuring Machine (CMM), Super micrometer etc.

CAD/CAM Laboratory

This laboratory aims to teach the students extensively about simulation software (ARENA), different types of designing software (AutoCAD, Solid Works, CATIA), Finite Element Analysis software (ANSYS) and programming language. The laboratory is equipped with modern computers, multimedia projector and high speed internet connections.

Instrumentation & Control Laboratory



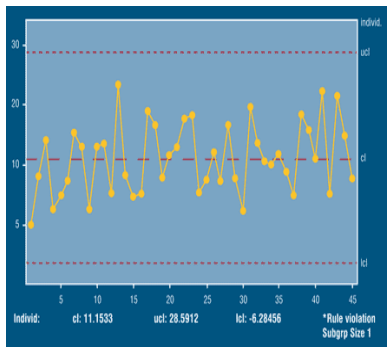
In the Instrumentation & Control Lab students get a broad idea about control and automation. They also get familiarized with the different automated controlling system and learn their working principles. The lab is equipped with two PLC (Programmable Logic Controller), Robot, Analog-Digital Motor Control, and Mechanism Maintenance Trainer Board. Thats how students learn with the esssence of working in a prototype of industrial enviornment and able to gain the basic knowledge about automation.

Material Handling Laboratory

In the Material Handling Laboratory students get a broad idea about the flow of materials and plant layout in a manufacturing facility. They also get familiarized with the material handling equipments and learn the working principles of these equipments. The laboratory is equipped with Screw conveyors, Belt conveyors, Roller Conveyors and different types of raw materials that are used in a manufacturing plant. This laboratory serves the purpose of making students learn with the essence of working in a real industrial environment and give them a practical experience to design a custom material handling system for any industry.

Quality Control Laboratory

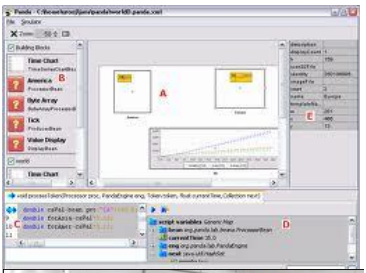
The objective of the laboratory is to familiarize students with the modern techniques applied to maintain the quality of products and services. Quality control laboratory is intended to facilitate conducting experiments using different Quality Control (QC) tools such as SPC, DoE, process capability measures etc. In addition, experiments on Failure Mode Effect Analysis (FMEA) and reliability of components and systems are carried out.



Ergonomics & Safety Laboratory

The laboratory is planned to serve the need of optimized work design centers around two basic components; namely, workplace layout and method engineering. Relevant knowledge and expertise needed by an IPE graduate cannot be exaggerated in the context of the demands of present day world. In workplace layout practices, ergonomic principles dictate the terms while in method engineering, a traditional discipline dealing with analysis and synthesis of man machine interaction leads to the optimized utilization of human resources and facilities.

Simulation & Optimization Laboratory



Simulation is done to verify the performances, identify the possible configuration and parameter values of a system. In the Simulation Lab students get the idea about the different simulation and optimization software like Matlab, Arena, Ansys, COMSOL, Materials Studio etc. The lab is equipped with modern computer and high speed internet connection. From this lab students get the idea about how to simulate an event and get the basic knowledge of stress and material property analysis.

Production Process Laboratory

In the Production Process Lab students get a broad idea about the different welding joint and their strength. They also study the microstructure of the welded joint. Again they study different joint test method. The lab is equipped with microscope, different machines serve the purpose of joint test with computer control.

Product Design Laboratory

In the Product Design Lab students go through the steps of developing a commercial product. It may be a new product or any modification of the existing product. They need to conduct customer survey to get the idea about user requirements, and using quality function deployment they need to convert the requirements into technical ones. Later on the students develop a CAD design and by selecting suitable material they have to conduct stress analysis. Finally they select the suitable manufacturing process and manufacture the product. Submission of detailed cost & profit analysis is required to validate their submission.

2.4 RESEARCH

The department possesses a strong research base. The faculty members are actively involved in different research works. The major thrust of research are in the areas of CAD/CAM, CIM, New Materials and Processing, Operations Research, Intelligent Manufacturing, Advanced Quality Management, Facility Planning, Rapid Prototyping, Technology Management, MRP, ERP, Supply Chain Management, Production Planning and Control, Inventory Management, Maintenance Management, Marketing Management, Industrial Environment Management and Optimization Software Development. The department is planning for joint research established linkage with the industry and science organization.

2.5 INDUSTRIAL TOUR

Department emphasizes the importance of practical knowledge gained through various industrial tours and visits. These types of visits are well planned and structured so that the students are adequately exposed to the real industrial environment. Students are sent to different types of manufacturing and service organizations to conduct mentioned tour.

2.6 INDUSTRIAL PRACTICE

The course curriculum of IPE department contains one 3 credit-hrs course titled “Industrial Practice”. For this course, the students have to undertake 4/5 weeks of industrial attachment. During this period, the students will be actively involved in the activities of the industry. At the end of the course their performance will be evaluated jointly by the academic supervisors and industry supervisors. For years this industrial practice has helped students to earn the practical knowledge from different national and multinational manufacturing and service industries.

Chapter 3

RULES AND REGULATIONS FOR COURSE SYSTEM

The following are the rules and regulations for administering undergraduate course curricula through the course system. The following articles have been reproduced from *Rules and Regulations for Course System (May 1999)* after incorporating all the amendments that were subsequently made to it.

Rules, Regulations, Course Offering Evaluation and Grading

3.1 ORGANIZATIONAL FRAMEWORK OF THE BACHELOR'S DEGREE PROGRAMS

The undergraduate curricula at Bangladesh University of Engineering & Technology (BUET) are based on the course system. The salient features of the course system are:

(a) Reduction of the number of theoretical courses and examination papers to around five in each term,
(b) The absence of a pass or a fail on an annual basis,
(c) Continuous evaluation of student's performance,
(d) Introduction of Letter Grades and Grade Points instead of numerical grades,
(e) Introduction of some additional optional courses and thus enable students to select courses according to his/her interest as far as possible,
(f) Opportunity for students to choose fewer or more courses than the normal course load depending on his/her capabilities and needs,
(g) The flexibility to allow the student to progress at his/her own pace depending on respective ability or convenience, subject to the regulations on credit and minimum Grade Point Average (GPA) requirements, and
(h) Promotion of teacher-student contact.

In the curriculum for the undergraduate program, besides the professional courses pertaining to each discipline, there is a strong

emphasis on acquiring a thorough knowledge in the basic sciences of Mathematics, Physics and Chemistry. Due importance is also given on the study of several subjects in Humanities and Social Sciences which, it is expected will help the student to interact more positively with the society. Thus the course contents of the undergraduate program provide a harmonious blend of basic sciences and their applications as well as their social relevance.

The first two terms of Bachelor's degree program consist of courses in basic sciences, mathematics, humanities and social sciences, basic engineering and architecture subjects. The third and subsequent terms build directly on the knowledge of the basic subjects gained in the first two terms and go on to develop competence in specific disciplines.

3.2 STUDENT ADMISSION

Students will be admitted in undergraduate curricula in the Departments of Architecture, Urban and Regional Planning, Chemical Engineering, Civil Engineering, Water Resources Engineering, Computer Science and Engineering, Electrical and Electronic Engineering, Mechanical Engineering, Industrial & Production Engineering, Materials and Metallurgical Engineering and Naval Architecture and Marine Engineering as per existing rules of the University. The Registrar's Office will continue to serve as Admissions Office and will deal with course registration in addition to student admission.

3.3 NUMBER OF TERMS IN A YEAR

There will be two terms (Term I and Term II) in an academic year.

Duration of each term will be 26 weeks which includes classes, preparatory leave, exams and intervals between successive terms.

3.4 COURSE PATTERN AND CREDIT STRUCTURE

The entire undergraduate program is covered through a set of theoretical and laboratory/ sessional/ studio courses.

3.4.1 Course Designation and Numbering System

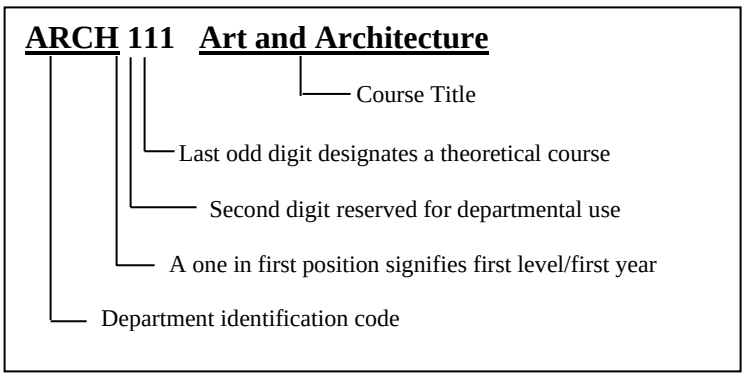
Each course is designated by a two to four letter word identifying the department and a three-digit number with the following criteria:

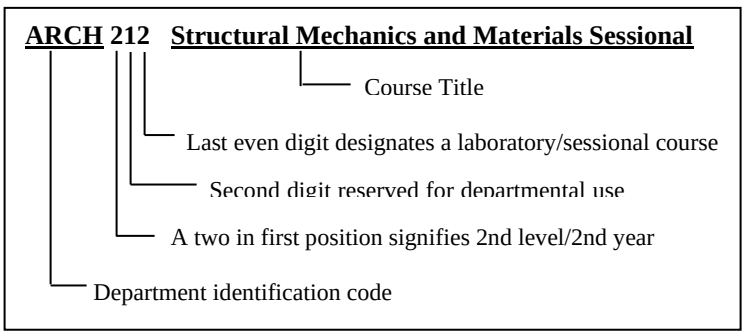
(a) The first digit will correspond to the year/level in which the course is normally taken by the students.

(b) The second digit will be reserved for departmental use for such things as to identify different areas within a department.

(c) The last digit will usually be odd for theoretical and even for laboratory or sessional courses.

The course designation system is illustrated by two examples.





3.4.2 Assignment of Credits

(a) Theoretical Courses
One lecture per week per term will be equivalent to one credit

(b) Laboratory/ Sessional/ Design
Credits for laboratory/sessional or design courses will be half of the class hours per week per term

Credits are also assigned to project and thesis work taken by students. The amount of credits assigned to such work may vary from discipline to discipline.
The curriculum does not demand the same rate of academic progress from all students for obtaining the degree but only lays down the pace expected from a normal student. A student whose background or capacity for assimilation is lower will be permitted to complete the program at a slower pace by studying less number of courses during a given term (subject to a minimum course load). He may keep pace with his class by taking during the Short Term those courses which he had dropped during the Regular Terms, or by covering the entire degree program over an extended period without developing any feeling of inferiority complex.

3.5 TYPES OF COURSES

The courses included in undergraduate curriculum are divided into several groups as follows:

3.5.1 Core Courses

In each discipline a number of courses will be identified as core courses which form the nucleus of the respective bachelor's degree program. A student has to complete all of the designated core courses for his discipline.

3.5.2 Pre-requisite Courses

Some of the core courses are identified as pre-requisite courses. A pre-requisite course is one which is required to be completed before some other course(s) can be taken. Any such course, on which one or more subsequent courses build up, may be offered in each of the two Regular Terms.

3.5.3 Optional Courses

Apart from the core courses, students will have to complete a number of courses, which are optional in nature, in that students will have some choices to choose the required number of courses from a specified group/ number of courses.

3.6 COURSE OFFERING AND INSTRUCTION

The courses to be offered in a particular term will be announced and published in the Course Catalogue along with a tentative Term Schedule before the end of the previous term. Whether a course is to be offered in any term will be decided by the respective BUGS. Respective department may arrange to offer one or more pre-requisite or core courses in any term depending on the number of students who dropped or failed the course in the previous term.

Each course is conducted by a teacher. The course teacher is responsible for maintaining the expected standard of the course and for the assessment of student's performance. Depending on the strength of registered students (i.e. the number of students) enrolled for course, the teacher concerned might have course associates and teaching assistants (TA) to help him in teaching and assessment.

For a course strength, necessitating two or more parallel classes or sections, one of the course teachers or any other member of the teaching staff of the department be designated as course co-ordinator. He/she has the full responsibility for co-ordinating the work of the other members of the department involved in that course.

3.7 DEPARTMENTAL MONITORING COMMITTEE

Consistent with its resilient policy to keep pace with new developments in the field of science and technology, the university will update its course curriculum at frequent intervals (at least every three years). Such updating aims not only to include the expanding frontiers of knowledge in the various fields but also to accommodate the changing social, industrial and professional need of the country. This can be done through deletion and modification of some of the courses and also through the introduction of new ones.

Board of Undergraduate Studies (BUGS) of each department will constitute a Departmental Monitoring Committee with three teachers of the department. This committee will monitor and evaluate the performance of the Course System within the department. In addition to other teachers of the department, the committee may also propose from time to time to the BUGS any changes and modifications needed for upgrading the Undergraduate Curriculum and the Course System[1].

3.8 TEACHER STUDENT CONTACT

The proposed system encourages students to come in close contact with teachers. For promotion of teacher-student contact, each student is assigned to an Advisor and the student is free to discuss with his Advisor all academic matters, especially those related to courses taken and classes being attended by him. Students are also encouraged to meet with other teachers any time for help on academic matters.

3.9 STUDENT ADVISOR

One Advisor would normally be appointed for a batch of student by the Undergraduate Board of Studies of the concerned department(s) who will advise each student on the courses to be taken by the student. Advisor will discuss with the student his/her academic program and then decide the number and nature of courses for which

[1] Amended Vide A.C Resolution dated 7.9.93 & 13.9.93

he/she can register. However, it is the student's responsibility to keep contacts with his Advisor who will review and eventually approve the student's specific plan of study and check on subsequent progress. The Advisor should be in the rank of an Assistant Professor or above from the concerned department(s).

For a student of second and subsequent terms, the number and nature of courses for which he/she can register will be decided on the basis of his/her academic performance during the previous term. The Advisor will advise the student to register for the courses during the next term within the framework of the guidelines in respect of minimum/maximum credit hours limits, etc. which are elaborated at appropriate places in this report. The Advisor is also authorized to permit the student to drop one or more courses based on his/her academic performance and the corresponding categorization (see Art. 3.16 for details).

Special provisions exist for academically weak students with regard to make-up courses (see Art.3.19 for details).

3.10 REGISTRATION REQUIREMENTS

Any student who makes use of class room or laboratory facilities or faculty time is required to register formally. Being admitted to the University, each student is assigned to a student Advisor. The student can register for courses he intends to take during a given term only on the basis of the advice and consent of his/her Advisor.

3.10.1 Registration Procedure

Students must register for each class in which they want to participate in consultation with his/her Advisor. This can be done online within a specified deadline at http://biis.buet.ac.bd where a student can select courses in the online course registration form. The student is then required to meet his/her Advisor to finalize and confirm the registration. Much counseling and advising is accomplished at the registration time. It is absolutely necessary that all students register at the specified time.

3.10.2 Limits on the Credit Hours to be Taken

A student must be enrolled in at least 15 credit hours. He may be allowed to enroll in up to a maximum of 24 credit hours if recommended by his/her Advisor. A student must enroll for the prescribed sessional/laboratory courses in the respective term within the allowed credit-hour limits.

In special cases where a student cannot be allotted the minimum required 15 credit hours in a term, the relevant BUGS may approve a lesser number of credit hours to suit individual requirements. Such cases shall only be applicable to students needing less than 15 credits for graduation[2].

3.10.3 Pre-condition for Registration

Some courses involve pre-requisite courses. A student will be allowed to register in those courses subject to the satisfaction of pre-requisite courses. If a student fails in a pre-requisite course in any term, the concerned BUGS may allow him to register for a course which builds on the pre-requisite course provided his/her attendance and grades in continuous assessment in the pre-requisite course is found to be satisfactory.

Registration will be done at the beginning of each term. The registration program with dates and venue will be announced in advance. Late registration is, however, permitted within the 4th week after starting the classes on payment of a late registration fee. Students having outstanding dues to university or a hall of residence shall not be permitted to register. All students have, therefore, to clear their dues and get a clearance or no dues certificate, on the completion of which, they will be given necessary permission to complete the course registration procedure. For the first Year students, prior department-wise enrolment/admission is mandatory. An orientation program will be conducted for them at the beginning of the first term when they will be handed over the registration package on producing enrollment slip/proof of admission

[2] Added Vide A.C Resolution dated 28.8.97

3.10.4 Pre-registration[3]

Pre-registration for courses to be offered by the students in a particular term will be done on a specified date before the end of the previous term. All students in consultation with their course Advisor are required to complete the pre-registration formalities, failing which a fine of Tk. xx.xx (amount may be decided by the authority) would have to be paid before registration in the next term. Further a student who does not pre-register may not get the courses desired by him subsequently.

3.10.5 Registration Deadline

Student must register for the courses to be taken before the commencement at a due date within the first 2 weeks after commencement of classes in each term and no late registration will be accepted after one 4th week of classes. Late registration after this date will not be accepted unless the student submits a written appeal to the Registrar through the concerned Head and can document extenuating circumstances such as medical problems (physically incapacitated and not able to be presented) from the Chief Medical Officer of the University or some other academic commitments which precluded enrolling prior to the last date of registration.[4]

3.10.6 Penalty for Late Registration

Students who fail to register during the designated dates for registration are charged a late registration fee of Tk. 500.00 (five hundred) only. This extra fee will not be waived whatever be the reason for late registration.

3.10.7 Course Adjustment Procedure

A student will have some limited options to add or delete & dropping courses from his/her registration list, within the first four weeks from the beginning of the term. However, minimum credit requirements mentioned in the Art. 3.10.2 need to be fulfilled after the adjustments.

---

[3] Currently not in practice

[4] Amended Vide A.C Resolution dated 15.06.2008

He/She may add courses only within the first four weeks of a regular term and only the first week of short term. In case of dropping a course a student will be allowed to do so within four weeks after the commencement of a regular term and two weeks after commencement of a Short Term. Adjustment of initially registered courses in any term can be done by duly completing the **Course Adjustment Form.** These forms will normally be available in the Registrar's Office. For freshman students such forms can be included in the registration packet at the time of orientation.

Any student willing to add or drop courses will have to fill up a Course Adjustment Form in consultation with and under the guidance of his/her Advisor. The original copy of the Course Adjustment Form will be submitted to the Registrar's Office, and then the requisite number of photo copies will be made by the Registrar's Office for distribution to the concerned Advisor, Head, Dean, Controller of Examination and the student.

All changes in courses must be approved by the Advisor and the Head of the department concerned. The Course Adjustment Form will have to be submitted to the Registrar's Office after duly filled in and signed by the concerned persons. To add/drop a course respective teacher's consent will be required.

Late registration fee is not necessary in these cases.[5]

3.10.8 Withdrawal from a Term

If a student is unable to complete the Term Final Examination due to serious illness or serious accident, he/she may apply to the Head of the degree awarding department for total withdrawal from the term within a week after the end of the Term Final Examination. However, he/she may chose not to withdraw any laboratory / sessional / design course if the grade obtained in such a course is 'D' or better. The application must be supported by a medical certificate from the Chief Medical Officer of the University. The Academic Council will take the final decision about such applicants.[6]

---

[5] Amended Vide A.C Resolution dated 15.06.2008

[6] Amended Vide A.C Resolution dated 14.3.96. Shall be applicable from beginning of Course System with effect from 214th Meeting of A.C held on 30.9.,4.10 & 19.10.92

3.11 THE GRADING SYSTEM

The total performance of a student in a given course is based on a scheme of continuous assessment. For theory courses this continuous assessment is made through a set of quizzes/in class evaluation, class participation, homework assignments, and a term final examination. The assessment in laboratory/sessional courses is made through observation of the student at work in class, viva-voce during laboratory hours, and quizzes. For architecture students, assessments in design sessionals would be done through evaluation of a number of projects assigned throughout the term. As discussed earlier, each course has a certain number of credits which describes its weightage. A letter grade with a specified number of grade points is awarded in each course for which a student is registered. A student's performance is measured by the number of credits that he/she has completed satisfactorily and the weighted average of the grade points that he/she has maintained. A minimum grade point average is required to be maintained for satisfactory progress. Also a minimum number of earned credits should be acquired in order to qualify for the degree as prescribed under Art. 3.22.[7]
Letter grades and corresponding grade-points will be awarded in accordance with provisions shown below[8].

Numerical grade	Letter Grade		Grade Point
80% or above	A+	(A plus)	4.0
75% to less than 80%	A	(A regular)	3.75
70% to less than 75%	A-	(A minus)	3.5
65% to less than 70%	B+	(B plus)	3.25
60% to less than 65%	B	(B regular)	3.0
55% to less than 60%	B-	(B minus)	2.75
50% to less than 55%	C+	(C plus)	2.5
45% to less than 50%	C	(C regular)	2.25
40% to less than 45%	D		2.0
less than 40%	F		0.0
Continuation (for project & thesis / design courses)	X		-

[7] Amended Vide A.C Resolution dated 7.9.93 & 13.9.93
[8] Amended Vide A.C Resolution dated 7.9.93 & 13.9.93

3.11.1 Distribution of Marks

Thirty percent (30%) of marks shall be allotted for continuous assessment i.e, quizzes and homework assignments, in class evaluation and class participation. The remainder of the marks will be allotted to Term Final examination which will be conducted centrally by the University. There will be internal and external examiners for each course in the term Final Examination. The duration of each term final examination will be 3 hours. The distribution of marks for a given course will be as follows[9] :

(a) Class participation 10%
(b) Homework Assignment and Quizzes 20%
(c) Final Examination (3 hours) 70%

Total 100%

Basis for awarding marks for class participation and attendance is generally as follows[10] :

Attendance	Marks
90% and above	10
85% to less than 90%	9
80% to less than 85%	8
75% to less than 80%	7
70% to less than 75%	6
65% to less than 70%	5
60% to less than 65%	4
less than 60%	0

For 2 credit courses 3 best out of 5, for 3 credit courses 4 best out of 6, and for 4 credit courses 5 best out of 7 quizzes may be considered for awarding grade. These may be considered as the minimum recommended number of quizzes for any course. If the number of quizzes administered in a course exceeds these suggested minimum numbers, then two-thirds best of all quizzes may be considered. The scheme of continuous assessment that a teacher proposes to follow for a course will be announced on the first day of classes.

[9] Amended Vide A.C Resolution dated 7.9.93 & 13.9.93
[10] Amended Vide A.C Resolution dated 7.9.93 & 13.9.93

"The number of quizzes of a course shall be at least n+1, where n is the number of credits of the course. Evaluation of the performance in quizzes will be on the basis of the best n quizzes. The scheme of continuous assessment that a teacher proposes to follow for a course will be announced on the first day of classes".[11]

3.12 EARNED CREDITS

Amended Vide A.C Resolution dated 7.9.93 & 13.9.93	The courses in which a student has obtained `D' or a higher Grade will be counted as credits earned by him/her. Any course on which a student has obtained `F' grade will not be counted towards his/her earned credits. A student who obtains an `F' grade in any Core Course in any term, will have to repeat the course. If a student obtains a `F' grade in an Optional Course, he/she may choose to repeat the course or take a substitute course if available. F grades will not be counted for GPA calculation but will stay permanently on the Grade Sheet and Transcript. When a student repeats a course in which he/she previously obtained an F grade, he/she will not be eligible to get a grade better than C in such a course. If a student obtains a grade other than 'F' in a course, he/she will not be allowed to repeat the course for the purpose of grade improvement.

[11] Amended Vide A.C Resolution dated 28-12-98
(effective from 1998-99 session) for newly admitted students of Level I Term I)

Amended Vide A.C Resolution dated 14.3.96 & 16.4.96

The courses in which a student has obtained 'D' or a higher Grade will be counted as credits earned by him/her. Any course in which a student has obtained 'F' grade will not be counted towards his/her earned credits.

A student who obtains 'F' grade in a Core Course in any term will have to repeat the course.

If a student obtains 'F' grade in an Optional Course he / she may choose to repeat the Course or take a Substitute Course if available.

'F' grades will not be counted for GPA calculation but will stay permanently on the Grade Sheet and Transcript. When a student ~~will~~ repeats a course in which he / she previously obtained 'F' grade, he/she will not be eligible to get a grade better than 'C' in such a course.

If a student obtains 'D' grade in a course, he/she will be allowed to repeat the course for the purpose of grade improvement by foregoing his/her earlier grade, but he/she will not be eligible to get a grade better than 'C' in such a course.

If a student obtains 'C' or a better grade in any course, he/she will not be allowed to repeat the course for the purpose of grade improvement.

Amended Vide A.C Resolution dated 28-12-98 (Effective from the term commencing on 6.12.1998 and afterwards).

'F' grades will not be counted for GPA calculation but will stay permanently on the Grade Sheet and Transcript. When a student will repeat a course in which he/she previously obtained 'F' grade, he/she will not be eligible to get a grade better than "B" in such a course.

If a student obtains a grade lower than 'B' in a course, he/she will be allowed to repeat the course only once for the purpose of grade improvement by forgoing his/her earlier grade, but he/she will not be eligible to get a grade better than 'B' in such a course. A student will be permitted to repeat for grade improvement purposes a maximum of four courses in B.Sc Engg. and BURP program and a maximum of five courses in B. Arch program.

If a student obtains 'B' or a better grade in any course, he/she will not be allowed to repeat the course for the purpose of grade improvement."

The above amendments will not be effective from the beginning of the Course System instituted in the University in 1992, rules for which were first approved by the Academic Council in its 214th meeting held on 30.9, 4.10 & 19.10.92.

3.13 HONORS

Candidates for Bachelor's degree in engineering and architecture will be awarded the degree with honors if their overall GPA is 3.75 or better.

3.13.1 Dean's List

Amended Vide A.C Resolution dated 7.9.93 & 13.9.93	As a recognition of excellent performance, the names of students obtaining an average GPA of 3.75 or above in two regular Terms in each academic year may be published in the Dean's List in each faculty. Students who have received F grade in any course during any of the two regular terms will not be considered for Dean's List in that year.
Vide A.C Resolution dated 9.3.94 & 11.4.94	[Note: Clause 13.1 of Rules and Regulations for Course System provides for publishing in the Dean's list names of those students obtaining a GPA of at least 3.75 in two regular terms. Explanation for this is that the average of Term GPA of the two terms will have to be 3.75 or more "The Students whose G.P.A will fail below 2.20 will have to be notified so that the necessary remedial measures can be taken". The students whose G.P.A falls below 2.20 will have to be notified so that the necessary remedial measures can be taken

3.14 CALCULATION OF GPA

Grade Point Average (GPA) is the weighted average of the grade points obtained in all the courses passed/completed by a student. For example, if a student passes/completes five courses in a semester having credits of C_1, C_2, C_3, C_4, and C_5 and his grade points in these courses are G_1, G_2, G_3, G_4, and G_5, respectively then

$$GPA = \frac{\sum C_i G_i}{\sum C_i}$$

3.14.1 A Numerical Example

Suppose a student has completed five courses in a Term and obtained the following grades:

Amended Vide A.C Resolution dated 7.9.93 & 13.9.93	Course	Credits	Grade	Grade points
	EEE 203	3	A^+	4.00
	EEE 205	3	B	3.00
	EEE 207	3	A	3.75
	Math 205	2	B^+	3.25
	Hum 203	1	A^-	3.50

Then his GPA for the term will be computed as follows:

$$\text{GPA} = \frac{3(4.0) + 3(3.0) + 3(3.75) + 2(3.25) + 1(3.5)}{(3 + 3 + 3 + 2 + 1)} = 3.52$$

3.15 STUDENT CLASSIFICATION

For a number of reasons it is necessary to have a definite system by which to classify students as First Year Level 1, Second Year Level 2, Third Year/Level 3, and Fourth Year/ Level 4. At BUET, regular students are classified according to the number of credit hours earned towards a degree. The following classification applies to the students.

	Year/ Level	Earned credit Hours	
		Engineering/ URP	Architecture
Amended Vide A.C Resolution dated 07.07.2007	First Year / Level 1	0 to 36	0 to 34
	Second Year / Level 2	>36 to 72	>34 to 72
	Third Year / Level 3	>72 to 108	>72 to 110
	Fourth Year / Level 4	> 108	> 110 to 147
	Fifth Year / Level 5		> 147

3.16 REGISTRATION FOR THE SECOND AND SUBSEQUENT TERMS

A student is normally required to earn at least 15 credits in a term. At the end of each term, the students will be classified into the following three categories:

Category 1
Consisting of students who have passed all the courses prescribed for the previous term and have no backlog of courses. A student belonging to Category 1 will be eligible to register for all courses prescribed for the next term.

Category 2
Consisting of students who have earned at least 15 credits in the term but do not belong to Category 1. A student belonging to Category 2 is advised to take at least one course less in the next term subject to the condition that he has to register for such backlog courses as may be prescribed by the Advisor.

Category 3
Consisting of students who have failed to earn 15 credits in the previous term. A student belonging to Category 3 is advised to take at least two courses less subject to registration for a minimum of 15 credits. However he will be required to register for such backlog courses as may be prescribed by the Advisor.

3.17 PERFORMANCE EVALUATION

The performance of a student will be evaluated in terms of two indices, viz. term grade point average, and cumulative grade point average, which is the grade average for all the terms. The term grade point average is computed dividing the total grade points earned in a term by the number of term hours taken in that term. The overall or cumulative grade point average (CGPA) is computed by dividing the total grade points accumulated up to date by the total credit hours earned. Thus a student who has earned 275 grade points in attempting 100 credit hours of courses would have an overall grade point average of 2.75.

Students will be considered to be making normal progress toward a degree if their cumulative or overall GPA for all work attempted is 2.20 or more. Students who regularly maintain Term GPA of 2.20 or better are making good progress toward their degrees and are in good standing with the University. Students who fail to maintain this minimum rate of progress will not be in good standing. This can happen when one or more of the following conditions exist:

(a) Term GPA falls below 2.20 or
(b) Cumulative GPA falls below 2.20
(c) Earned credits fall below 15 times the number of Terms attended/ studied

All such students can make up deficiencies in GPA and credit requirements by completing courses in next term(s) and backlog courses, if there be any, with better grades. When GPA and credit requirements are achieved, the student is returned to good standing.

3.18 ACADEMIC PROGRESS, PROBATION AND SUSPENSION

Academic Progress: Undergraduate students will be considered to be making normal progress toward a degree if their cumulative or overall GPA for all work attempted is not less than 2.20.

Probation and Suspension: Undergraduate students who regularly maintain Term GPA of 2.20 or better are making good progress toward their degrees and are in good standing with the University. Students who fail to maintain this minimum rate of progress may be placed on academic probation.

The status of academic probation is a reminder/warning to the student that satisfactory progress towards graduation is not being made. A student may be placed on academic probation when either of the following conditions exist:

(a) the term GPA falls below 2.20 or
(b) the cumulative GPA falls below 2.20

Students on probation are subjected to such restrictions with respect to courses and extracurricular activities as may be imposed by the respective Dean of faculty.

The minimum period of probation is one Term, but the usual period is for one academic year. This allows the student an opportunity to improve the GPA through the completion of additional course work during the period that the student is on probation. The probation is extended for additional terms until the student achieves an overall GPA of 2.20 or better. When that condition is achieved the student is returned to good standing.

Academic probation is not to be taken lightly - it is a very serious matter. A student on academic probation who fails to maintain a GPA of at least 2.20 during two consecutive academic years may be suspended from this University. A student who has been suspended may submit a petition to the Dean of faculty, but this petition will not be considered until the student has been suspended for at least one full term.

Petitions for reinstatement must set forth clearly the reasons for the previous unsatisfactory academic record and it must delineate the new conditions that have been created to prevent the recurrence of such work. Each such petition is considered individually on its own merits.

After consideration of the petition, and perhaps after consultation with the student, the Dean in some cases, reinstate the student, if this is the first suspension. However, a second suspension will be regarded as final and absolute.

3.19 MEASURES FOR HELPING ACADEMICALLY WEAK STUDENTS

The following provisions will be made as far as possible to help academically weak students to enable them to complete their studies within the maximum period of seven years in engineering and eight years in architecture students, respectively:

(a) All such students whose cumulative grade point average (CGPA) is less than 2.20 at the end of a term may be given a load of not exceeding four courses in the next term.

(b) For other academic deficiencies, some basic and core courses may be offered during the Short Term in order to enable the student to partially make-up for the reduced load during Regular Terms.

Following criteria will be followed for determining academically weak students:

(a) CGPA falling below 2.20.
(b) Term grade point average (TGPA) falling below 2.20 points below that of previous term.
(c) Earned credit falling below 15 times the number of terms attended.

3.20 SPECIAL COURSES

(a) *These courses, which include self-study courses, will be from amongst the regular courses listed in the course catalog, a special course can be run only in exceptional cases with the approval of the Syndicate.*

Amended Vide A.C Resolution dated 28.8.97	These courses, which include self-study courses, will be from amongst the regular theory courses listed in the course catalog, a special course can be run only in exceptional cases.

(b) *Whether a course is to be floated as special course will be decided by the Head of concerned department in consultation with the teacher/course co-ordinator concerned if it is required to be offered in Short Term.*

Amended Vide A.C Resolution dated 28.8.97	Whether a course is to be floated as a special course will be decided by the Head of concerned department in consultation with the teacher/course co-ordinator concerned. Decision to float a course as a special course shall be reported to the Academic Council.

(c) *The special course may be offered to any student in his/her last term if it helps him/her to graduate in that term. It will be offered only if the course is not running in that term as a regular course.*

(d) *Normally no lecture will be delivered for the special course but laboratory/design classes may be held if they form a part of the course. The course coordinator/course teacher will also assign homeworks, administer quizzes and final examination for giving his or her assessments at the end of the term.*

(e) *A course of weightage up to 6 can be taken as a self-study course.*

Amended Vide A.C Resolution dated 28.8.97.	A student will be allowed to register for a maximum of two courses on self-study basis.
Added Vide A.C Resolution dated 28.12.98	A Special Course shall not be utilized for grade improvement purposes.
Added Vide A.C Resolution dated 19.06.2007	To finish the Backlog Courses, students are allowed to take 1 theory course in addition to the 5 theory courses in the term immediately before their Graduating Term.

3.21 RULES FOR COURSES OFFERED IN A SHORT TERM

(a) The courses to be run during the Short Term shall be decided on the recommendations of departments on the basis of essential deficiencies to be made up by a group of students. Once floated, other students could be allowed to register in those courses subject to the capacity constrains and satisfaction of prerequisites.

(b) Student will be allowed to register in a maximum of two courses during the Short Term.

(c) A course may be given a weightage up to 6 credits in any Short Term following a graduating/final Term if he/she is short by a maximum of 6 earned credits only, on a self-study basis with no formal instruction. In a self-study course, there will be a Final Examination, beside the continuous assessment.

(d) A fee of Tk. xx.xx for each credit hour to be registered to be borne by the students who enroll during Short Term.

3.22 MINIMUM EARNED CREDIT AND GPA REQUIREMENTS FOR OBTAINING GRADUATION

Minimum credit hour requirements for the award of bachelor's degree in engineering and architecture will be decided by the respective Undergraduate Board of Studies. However, at least 157 credit hours for engineering and 190 credit hours for architecture must be earned to be eligible for graduation, and this must include the specified core courses.

*Added Vide A.C. Resolution Dated 16.11.1995	The minimum GPA requirement for obtaining a bachelor's degree in engineering, *URP or architecture is 2.20.
Amended Vide A.C Resolution dated 13.8.97	Completion of fulltime Studentship : Students who have completed Minimum credit requirement for graduation for a Bachelor's degree shall not be considered and registered as fulltime students.

A student may take additional courses with the consent of his/her Advisor in order to raise GPA, but he/she may take a maximum of 15 such additional credits in engineering and *URP and 18 such additional credits in architecture beyond respective credit-hour requirements for bachelor's degree during his/her entire period of study.

3.22.1 Application for Graduation and Award of Degree

Amended Vide A.C Resolution dated 7.9.93 & 13.9.93	A student who has fulfilled all the academic requirements for Bachelor's degree will have to apply to the Controller of Examinations through his/her Advisor for graduation. Provisional degree will be awarded on completion of credit and GPA requirements. Such provisional degrees will be confirmed by the Academic Council.

3.22.2 Industrial/Professional Training Requirements

Added Vide A.C Resolution dated 24.07.96 & 25.07.96

Depending on each department's own requirement a student may have to complete a prescribed number of days of industrial/professional training in addition to minimum credit and other requirements, to the satisfaction of the concerned department.

Letter grade 'S' may be used for Satisfactory
Letter grade 'U' may be used for Unsatisfactory
In case of Unsatisfactory Performance he/she has to repeat the Industrial/Professional Training until he/she has earned 'S' grade.

3.23 TIME LIMITS FOR COMPLETION OF BACHELOR'S DEGREE

*Added Vide A.C. Resolution dated 16.11.1995

A student must complete his studies within a maximum period of seven years for engineering and *URP and eight years for architecture.

Added vide A.C. Resolution dated 09.01.2005

For the degrees of B.Sc. Engineering and BURP, maximum allowable number of terms is 14 and for the degree of B. Arch it is 16 respectively. But an additional term may be granted after judging the merit of individual case. An amount of Tk. 1000/- per credit shall have to be paid as registration fee for that extra term.

3.24 INCLUSION OF REPEATERS[12]

Repeater students from the old syllabus system will need to take the equivalent courses from the new syllabus system.

The irregular/repeater students will be subjected to the following rules and regulations:

[12] Added Vide A.C Resolution 080230 dated 21.4.08

1. If the original course in the old syllabus has only one equivalent course in the new syllabus then, the following rules apply for such courses:

(a) If he/she had received an 'F' or had not registered for the original course before, he/she has to complete the equivalent course as per the new syllabus and the earned credit will be equal to the credit of the equivalent course.

(b) If the student had received an 'F' in the original course in the old syllabus, he/she can get at most 'B' in the equivalent course of the new syllabus. If he/she had not registered for the original course (of old syllabus) before, he/she can get 'A+' in the equivalent course of the new syllabus.

(c) If the student had obtained a grade lower than 'B' in the original course and wants to retake the course for improvement, he/she has to register for the equivalent course as per the new syllabus (provided he/she fulfills the other conditions of registration).

2. If two or more of the original courses in the old syllabus have only one equivalent course in the new syllabus, then the following rules apply for such courses:

(a) If the student had received an 'F' or had not registered for **one/both** of the original courses before, he/she has to complete the equivalent course as per the new syllabus.

(b) The student will be considered to have completed the original courses if he/she has received passing grade in the equivalent course.

(c) If the student had registered in **all** of the original courses and have received an 'F' in **one/more** of those, he/she can get at most 'B' in the equivalent course.

(d) If the student had not registered for **at least one** of the original courses in the old syllabus before, he/she can get 'A+' in the equivalent course.

(e) If the student had obtained passing grade in **all** of the original courses below and had received a grade lower than 'B' in one/more courses he may be allowed to retake the equivalent course for improvement (provided he/she fulfills the other conditions of registration).

3. If the original course in the old syllabus has two/more equivalent courses in the new syllabus then, the following rules apply for such courses:

(a) If the student had received an 'F' or had not registered for the original course before, he/she has to complete **all** the equivalent courses as per the new syllabus.

(b) If the student had registered for the original course before and have received an 'F' in the course, he/she can get at most 'B' in all of the equivalent courses.

(c) If the student had not registered for the original course before, he/she can get 'A+' in any of the equivalent courses.

(d) If the student had received a grade lower than 'B' in the original course he/she may be allowed to retake any of the equivalent courses for improvement (provided he/she fulfills the other conditions of registration).

4. Two/more courses of the old syllabus cannot be regarded as equivalent to two/more courses in the new syllabus.

5. If the student is short of only one credit for graduation due to completion of courses from the new syllabus, he/she can be considered eligible for the receipt of the degree. But if the student is short of two/more credits for graduation due to completion of courses from the new syllabus, he/she needs to take one/more courses (based on suggestions from the Advisor) to be considered eligible for the receipt of the degree.

3.25 ATTENDANCE, CONDUCT, DISCIPLINE ETC.

3.25.1 Attendance

Amended Vide A.C Resolution dated 7.9.93 & 13.9.93	All students are expected to attend classes regularly. The university believes that attendance is necessary for effective learning. The first responsibility of a student is to attend classes regularly, and one is required to attend at least 60% of all classes held in every course.

3.25.2 Conduct and Discipline

A student shall conform to a high standard of discipline, and shall conduct himself, within and outside the precincts of the university in a manner befitting the students of a university of national importance. He shall show due courtesy and consideration to the employees of the university and Halls of Residence, good neighborliness to his fellow students and the teachers of the university and pay due attention and courtesy to visitors.

To safeguard its ideals of scholarship, character and personal behavior, the university reserves the right to require the withdrawal of any student at any time for any reason deemed sufficient.

3.26 ABSENCE DURING TERM

A student should not be absent from quizzes, tests, etc. during the term. Such absence will naturally lead to reduction in points/marks which count towards the final grade. Absence in Term Final Examination will result in 'F' grades.

A student who has been absent for short periods, up to a maximum of three weeks due to illness should approach, the course teacher(s) or the course coordinator (s) for make-up quizzes or assignments immediately on returning to the classes. Such request should be supported by medical certificate from a University Medical Officer. The medical certificate issued by a registered medical practitioner (with the Registration Number shown explicitly on the certificates) will also be acceptable only in those cases where the student has valid reasons for his absence from the university.

3.27 DEPARTMENT CODE

01	Architecture
02	Chemical Engineering
03	Chemistry
04	Civil Engineering
05	Computer Science and Engineering
06	Electrical & Electronic Engineering
07	Humanities
08	Industrial and Production Engineering
09	Mathematics

10 Mechanical Engineering
11 Materials & Metallurgical Engineering
12 Naval Architecture & Marine Engineering
13 Petroleum & Mineral Resources Engineering
14 Physics
15 Urban & Regional Planning
16 Water Resources Engineering

3.28 BUILDING ABBREVIATION

ADM - Administration Building.
ARCH - Architecture Building.
CE - Civil Engineering Building.
EME - Electrical and Mechanical Engineering Building.
OAB - Old Academic Building
ECE - Electrical and Computer Engineering Building

Chapter 4

COURSE REQUIREMENTS FOR THE DEGREE OF B.SC. ENGG. IN IPE

4.1 INTRODUCTION

The undergraduate students of the Department of Industrial and Production Engineering have to follow the course schedule given in this chapter. The letter prefix in any course number indicates the department offering the course viz. IPE for Industrial and Production Engineering, ME for Mechanical Engineering, EEE for Electrical & Electronics Engineering, CSE for Computer Science and Engineering, Chem for Chemistry, Phy for Physics, Math for Mathematics, Hum for Humanities and Shop for Workshops. The first digit in the number indicates the year/level for which the course is intended. Odd number courses are theory courses and even numbered courses are sessional courses.

4.2 COURSES OFFERED IN DIFFERENT TERMS FOR B.Sc. ENGG. (INDUSTRIAL AND PRODUCTION ENGINEERING) DEGREE

Level 1 Term I

Course No	Course Title	Contact Hours	Credit Hours
Phy 117	Structure of Matter, Electricity, Magnetism and Modern Physics	3	3.00
Chem 119	Chemistry – I	3	3.00
Math 191	Differential and Integral Calculus	4	4.00
Hum 211	Sociology	2	2.00
IPE 105	Principles of Cost and Management Accounting	3	3.00
	Total Theoretical	**15.00**	**15.00**
ME 160	Mechanical Engineering Drawing - I	3	1.50
Shop 170	Machine Shop	3/2	0.75
Chem 114	Inorganic Quantitative Analysis Sessional	3	1.50
Hum 102	English Language Practice	3	1.50
	Total Sessional	**10.50**	**5.25**
	Grand Term Total	**25.50**	**20.25**

Level 1 Term II

Course No	Course Title	Contact Hours	Credit Hours
Math 193	Vector, Matrix and Solid Geometry	4	4.00
Phy 163	Waves and Oscillations, Physical Optics and Wave Mechanics	3	3.00
Chem 143	Chemistry of Materials	2	2.00
MME 195	Engineering Materials I	3	3.00
EEE 167	Basic Electrical & Electronic Circuit	4	4.00
	Total Theoretical	**16.00**	**16.00**
IPE 104	Engineering Graphics	3	1.50
Phy 102	Physics Sessional	3	1.50
EEE 168	Basic Electrical & Electronic Circuit Sessional	3	1.50
Shop 160	Foundry and Welding Shop	3/2	0.75
	Total Sessional	**10.50**	**5.25**
	Grand Term Total	**26.50**	**21.25**

Level 2 Term I

Course No	Course Title	Contact Hours	Credit Hours
Math 291	Differential Equation, Vector Calculus and Laplace Transform	3	3.00
EEE 271	Electrical Machines and Electronics	3	3.00
MME 295	Engineering Materials II	2	2.00
CSE 295	Computer Programming Techniques	3	3.00
ME 245	Engineering Mechanics and Theory of Machines	4	4.00
	Total Theoretical	**15.00**	**15.00**
EEE 272	Electrical Machines and Electronics Sessional	3	1.50
MME 296	Engineering Materials Sessional	3	1.50
CSE296	Computer Programming Techniques Sessional	3	1.50
IPE 204	Engineering Graphics and Introduction to CAD Sessional	3	1.50
	Total Sessional	**12.00**	**6.00**
	Grand Term Total	**27.00**	**21.00**

Level 2 Term II

Course No	Course Title	Contact Hours	Credit Hours
IPE 205	Manufacturing Processes I	3	3.00
IPE 207	Probability and Statistics	4	4.00
IPE 209	Engineering Economy	2	2.00
ME 243	Mechanics of Solids	3	3.00
ME 265	Thermodynamics and Heat Transfer	4	4.00
	Total Theoretical	**16.00**	**16.00**
IPE 206	Manufacturing Processes I Sessional	3/2	0.75
ME 244	Mechanics of Solids Sessional	3/2	0.75
ME 266	Thermodynamics and Heat Transfer Sessional	3	1.50
	Total Sessional	**6.00**	**3.00**
	Grand Term Total	**22.00**	**19.00**

Level 3 Term I

Course No	Course Title	Contact Hours	Credit Hours
ME 223	Fluid Mechanics & Machinery	3	3.00
IPE 301	Measurement, Instrumentation and Control	3	3.00
Hum 277	Fundamentals of Economics	3	3.00
IPE 305	Manufacturing Process II	3	3.00
IPE 307	Operations Research	4	4.00
	Total Theoretical	**16.00**	**16.00**
ME 224	Fluid Mechanics & Machinery Sessional	3	1.50
IPE 302	Measurement, Instrumentation and Control Sessional	3/2	0.75
IPE 306	Manufacturing Processes II Sessional	3/2	0.75
	Total Sessional	**6.00**	**3.00**
	Grand Term Total	**22.00**	**19.00**

Level 3 Term II

Course No	Course Title	Contact Hours	Credit Hours
IPE 303	Product Design I	3	3.00
IPE 311	Material Handling and Maintenance Management	3	3.00
IPE 315	Operations Management	3	3.00
IPE 319	Quality Management	3	3.00
IPE 329	Numerical Analysis	3	3.00
	Total Theoretical	**15.00**	**15.00**
IPE 304	Product Design I Sessional	3	1.50
IPE 312	Material Handling and Maintenance Management Sessional	3/2	0.75
IPE 320	Quality Management Sessional	3/2	0.75
IPE 322	Business Communication Seminar-I	2/2	0.5
	Total Sessional	**7.00**	**3.50**
	Grand Term Total	**22.00**	**18.50**

Level 4 Term I

Course No	Course Title	Contact Hours	Credit Hours
IPE 403	Project and Environmental Management	3	3.00
IPE 407	Ergonomics and Safety Management	3	3.00
IPE 451	Supply Chain Management	3	3.00
IPE 317	Product Design II	3	3.00
IPE ---	Optional-I	3	3.00
	Total Theoretical	**15.00**	**15.00**
IPE 400	Project and Thesis	6	3.00
IPE 408	Ergonomics and Safety Management Sessional	3/2	0.75
IPE 318	Product Design II Sessional	3	1.50
IPE 300	Industrial Practice	Max 5 wks (40 hrs/wk)	3.00
	Total Sessional	**10.50**	**8.25**
	Grand Term Total	**25.50**	**23.25**

Level 4 Term II

Course No	Course Title	Contact Hours	Credit Hours
IPE 401	Machine Tools	4	4.00
IPE 409	CAD/CAM	3	3.00
IPE 411	Industrial and Business Management	3	3.00
IPE ---	Optional II	3	3.00
	Total Theoretical	**13.00**	**13.00**
IPE 400	Project and Thesis	6	3.00
IPE 402	Machine Tools Sessional	3	1.50
IPE 410	CAD/CAM Sessional	3/2	0.75
IPE 470	Industrial Simulation Sessional	3/2	0.75
IPE 480	Business Communication Seminar II	2/2	0.50
	Total Sessional	**13.00**	**6.50**
	Grand Term Total	**26.00**	**19.50**

Grand total credit hours required for the degree of B.Sc. Engineering in Industrial and Production Engineering is **161.75**.

4.3 LIST OF OPTIONAL COURSES

IPE 415: CNC Machine Tools
IPE 419: Computer Integrated Manufacturing
IPE 421: Modern Machinery and Machining Processes
IPE 425: Micro-manufacturing
IPE 427: Marketing Management
IPE 429: Technology Management
IPE 445: Entrepreneurship Development and Micro Industries
IPE 453: Information Technology in Business
IPE 461: Organizational Behavior
IPE 463: Total Quality Management
IPE 465: Intelligent Manufacturing
IPE 467: Energy Management
ME 447: Robotics
ME 461: Control Engineering
CSE 443: Digital Logic and Micro-Processor Technology

Chapter 5

DETAIL OUTLINE OF UNDERGRADUATE COURSES

5.1 COURSES OFFERED TO IPE STUDENTS BY THE DEPARTMENT OF INDUSTRIAL AND PRODUCTION ENGINEERING

IPE 104: Engineering Graphics Sessional (1.5 credit hours)

Projection graphics: introduction, geometrical constructions, orthographic projections, axonometric projections and perspectives. Spatial graphics: descriptive geometry: traces of lines, points, lines and planes, parallelism and perpendicularity, surfaces, intersections and development, methods of revolution.

IPE 105: Principles of Cost and Management Accounting (3 credit hours)

Elements of accounting: the accounting equation; accounts, transactions, double entry mechanisms, financial statements, basic concepts: scope and application of cost and management accountancy, costing methods and techniques, income measurement in manufacturing companies, material costing and labor costing, overheads and their allocation, marginal costing and decision making among alternative courses of action, marginal costing vs. total absorption costing, financial statement analysis: understanding the financial statement, tests for probability liquidity, solvency and overall measure, budgets and their control.

IPE 204: Engineering Graphics and Introduction to CAD Sessional (1.5 credit hours)

Product graphics: drafting codes as per ISO, tolerances and dimensioning, ensuring co-axiality, perpendicularly and parallelism compatible to manufacturing and assembly requirements, schematic product symbols for welding and piping systems.

System graphics: working drawings of cumulative and non-cumulative assemblies, dimensioning of assembled parts, use of standard parts threads, fasteners and springs, detailing of assembled parts.

CAD: constructing geometry, transformation.

Viewing and clipping perspectives, modeling: generation of curves and surfaces, an introduction to solid modeling, automatic dimensioning and generation of bill of materials.

IPE 205: Manufacturing Process I (3 credit hours)

Classification of manufacturing processes, casting processes for ferrous and non-ferrous metals, sand, die, centrifugal, slush, plaster mold, loam mold, precision investment casting etc. Casting defects, design of moulds, riser, gate sprue and core, cost analysis.

Joining methods: soldering, brazing, welding, conventional welding processes: gas, arc, TIG, MIG, thermit, resistance, friction, electro slag etc. Special welding processes: LASER, electron beam, submerged arc etc. Precision and non-precision surface finishing operation, hot and cold extrusion, press working operations etc.

Manufacturing of ceramic and glass products, powder metallurgy.

IPE 206: Manufacturing Process I Sessional (0.75 credit hours)

Sessional work compatible to course no. IPE 205.

IPE 207: Probability and Statistics (4 credit hours)

Basic laws of probability, conditional probability, random variables, measures of central tendency and dispersion, mathematical exception, probability distributions, transformation of variables, moments and moment generating functions, sampling, central limit theorem, chi-square distribution, t-distribution, f-distribution: estimation and confidence interval, statistical hypothesis and testing, goodness-of-fit tests.

Correlation and regression analysis, analysis of variance, experimental designs, randomized block design, factorial design, introduction to stochastic problems in engineering.

IPE 209: Engineering Economy (2 credit hours)

Introduction to engineering economic decision making common to engineering, cash flow analysis and basic concepts of discounting, cost of capital, required ROR equivalence etc.

Business mathematics, investment appraisal criteria for economic decisions, present worth, internal rate of return, social consideration in investment, benefit-cost ratio, etc.

Decisions involving taxes, depreciation and inflation and sensitivity analysis.

IPE 300: Industrial Practice (5 weeks, 3 credit hours)

IPE 301: Measurement, Instrumentation and Control (3 credit hours)

Introduction to fundamentals of engineering measurements, study and use of instrumentation, and control systems.

Linear measuring system, instruments limits, fits and gauges: ISO system of limits and fits.

Precision dimensional measurement of length and angles, roundness profiles and flatness, surface roughness and texture, wear Taylor's principles on limit gauges, Abbey's principle, measuring threads, gears, measurement, ultrasonic measurement, measurement by light-wave interference, electrical and electronic measurement, digital recording by LASER beam dimension measuring system, opto-electronic, dimensional gauging, non-destructive testing methods (NDT methods), inspection and kinds of inspection, testing and calibration testing of gauges, dynamic measurement.

The characteristics and use of analogue and digital instrumentation applicable to industrial engineering problems, statistical methods for developing system specifications, basic concepts of modern instrumentation.

Concepts and importance of control system, control system description, state variable and transfer function representation, sensitivity, concepts of feedback-the feedback control system, electromechanical controls, digital computer control.

IPE 302: Measurement, Instrumentation and Control Sessional (0.75 credit hours)

Sessional work compatible to course no. IPE 301.

IPE 303: Product Design I (3 credit hours)

Functional aspects of a product, environment and human factors in design, value engineering, design morphology, standardization, ISO 9001, understanding customer needs, establishing product function specification, development, concept generation and evaluation.

Designing of machine parts for strength, deflection, stiffness, fatigue impact etc., designing of shaft, key and power screw, coupling, clutches and brakes.

IPE 304: Product Design I Sessional (1.5 credit hours)

Sessional work compatible to course no. IPE 303.

IPE 305: Manufacturing Process II (3 credit hours)

Metal removing processes: chip formation and tool design, tool geometry, chip breakers.

Theory of metal cutting: cutting forces, metal cutting dynamometers, economics of metal cutting, tool life.

Different machining processes – turning, drilling, shaping, planning, milling, grinding, reaming, broaching, etc. manufacture of threads and gears, modern machining processes: electro-chemical, electro-discharge, plasma etc., LASER beam, electron beam, ultrasonic and abrasive jet machining.

Plastics: plastic product manufacturing processes: compounding, extrusion, injection molding, compression molding, blow molding, vacuum forming and hand layup.

Selection of manufacturing processes on the basis of product characteristics and manufacturing economy.

IPE 306: Manufacturing Process II Sessional (0.75 credit hours)

Sessional works compatible to course no. IPE 305.

IPE 307: Operations Research (4 credit hours)

Introduction and scope of operations research, introduction to mathematical modeling: different kinds of modeling and their characteristics.

Classical optimization techniques involving single variable and multiple variables with and without constraints.

Linear models: simplex algorithm, duality, sensitivity analysis, transportation and assignment algorithm, game theory.

Integer programming, dynamic programming, queuing models, introduction to simulation, application: engineering, business and other sectors of economy.

IPE 311: Material Handling and Maintenance Management (3 credit hours)

Issues and importance of handling of materials: analysis of material handling problems, classification of materials, unit load, bulk loads, study of material handling systems and their efficiency, selection and classification of material conveying equipment.

Product handling: design system configuration conforming to various kinds of product features and layout characteristics.

Designing concepts of common handling and transfer equipments, different types of conveyors such as belt, screw, chain, flight, bucket elevators, pneumatic hydraulic cranes and forklifts, design of ware house facilities appropriate for relevant handling and transfer device, automatic packaging devices: testing procedure of packages: vibration test, drop test, performance limits and testing machines, algorithms to design and analyze discrete parts material storage and flow system such as automated storage/retrieval system (ASRS), order picking, automated guided vehicle system (AGVS).

Maintenance management: concept of maintenance and value of maintenance management, maintenance organization and department structure (resource and administration), types of maintenance, fixed time replacement, condition based maintenance, preventive and corrective maintenance, replacement strategies, documentation and computer control in maintenance management, Implementation of maintenance planning, plant asset management, human factors in motivation skills in a maintenance environment.

IPE 312: Material Handling and Maintenance Management Sessional (0.75 credit hours)

Sessional work compatible to course no. IPE 311.

IPE 315: Operations Management (3 credit hours)

Integrated purchase-production-marketing system, production systems, product/service life cycle, forecasting models, bill of materials, material and inventory management: inventory models, ABC analysis, coding and standardization, aggregate planning, MPS, MRP, capacity planning, operating scheduling.

Work study: MRP II, optimized production technology, group technology, TQC and JIT.

IPE 317: Product Design II (3 credit hours)

Reverse engineering, alternative solutions and their evaluation, designing for assembly and disassembly, reliability, product life cycle, cost analysis, use of standard parts, application of CAD software.

Prototype design, designing of engineering systems involving shafts, bearings, linkages, couplings, clutches brakes, gears, power transmission etc.

IPE 318: Product Design II Sessional (1.5 credit hours)

Integrated design based on the knowledge of reverse engineering reliability, cost analysis, strength, etc.

IPE 319: Quality Management (3 credit hours)

Emergence of modern concept of quality and its management, quality redefined, identification of quality characteristics: quality of design, conformance and performance, Deming's principle on quality and productivity, quality costs and their interpretation.

Control and measurement concept of quality: elementary SPC tools-PDCA cycle, Pareto's law, cause and effect (fishbone), control charts-attribute control charts and variable control charts, measurement of variation and process capability analysis, design of experiments- identification of key variables for major variations.

Acceptance sampling plans: OC curves, single and double sampling plants, sequential and rectifying inspection plans AOQ.

Quality and reliability: failure and survival probability, hazard rate, component and system reliability and its prediction, failure mode and fault tree analysis, reliability testing.

Quality standards and their compliance, ISO 9000 and ISO 14000, foundations of quality revised – total quality management (TQM), application of TQM philosophy, frontiers of quality.

IPE 320: Quality Management Sessional (0.75 credit hours)

Sessional work compatible to course no. IPE 319.

IPE 322: Business Communication Seminar I (0.5 credit hours)

IPE 329: Numerical Analysis (3 credit hours)

Errors and approximations in numerical computations, rules of polynomials and transcendental equations, multiple roots, solution of linear algebraic equations: Gauss elimination, Guass-Jordan elimination, Choleski's decomposition, Guass-Siedel iteration,

Eigen-value problems, interpolation and extrapolation techniques, Curve fitting, numerical differentiation and integration, solution of ordinary differential equations: Taylor's series method, Euler's method, Milne's method, Runge-Kutta methods, numerical optimization techniques.

IPE 400: Project and Thesis (6 credit hours)

IPE 401: Machine Tools (4 credit hours)

Characteristics of machine tools, recent development in the design of machine tools, drive system of machine tools, design of mechanical drive, speed gear boxes, feed gear boxes, infinitely variable drives, PIV and other mechanical step less drives, hydraulic drives, electrical drives, bearings, spindles, slide ways of machine tools, machine tool structure.

Location principles and locators, clamps.

Detailed case study of engine, turret and automatic lathes, drilling machines, shaper machines, planer machines, milling machines, grinding machines, gear shaping and gear hobbing machines, forging machines, dynamics of machine tools, installation and acceptance tests of machine tools, automatic transfer lines.

IPE 402: Machine Tools Sessional (1.5 credit hours)

Sessional work compatible to course no IPE 401.

IPE 403: Project and Environment Management (3 credit hours)

Project: identification, planning, appraisal, project implementation, project organization, budgeting, scheduling, using bar diagram, CPM, PERT, resource allocation, information system and project control, project termination, project organizations, matrix organization, project manager, contract negotiation and conflict resolution, case study, planning and evaluation of an investment project.

Environmental impact assessment of projects.

Source of degradation of earth's ecosystem, technological development, greenhouse gases, ozone layer depletion, toxic gases and industrial wastes, Montreal protocol, remedies Noxious China-sun refrigerant technologies and use of catalysts, environmental economics and accounting system.

IPE 407: Ergonomics and Safety Management (3 credit hours)

Man-machine-material interfaces in manufacturing: physical and cognitive aspects, comparative advantages of man and machine, physical work and human muscular effort, bio-mechanics and bio-engineering.

Anthropometry, work place design and work place layout, human performance under environment temperature, illumination, vibration, noise, pollution radiation static and dynamic conditions.

Evolution of modern safety concepts, industrial hazard, safety and risk management, productivity, worker health and safety, proactive management techniques for safety management, safety standards and regulations for engineering works, case studies.

IPE 408: Ergonomics and Safety Management Sessional (0.75 credit hours)

Sessional work compatible to course no. IPE 407.

IPE 409: CAD/CAM (3 credit hours)

CAD: Fundamental concepts, application, hardware and software, types of CAD systems, common 2D CAD software features, basic 3D CAD features.

CAM: fundamental concepts, trend of development of NC, principles of NC, types of NC systems and machines, NC manual part programming, CNC part programming using APT language, interfacing CAM software with CNC machines, implementing the CAD/CAM system principles of FMS.

Robotics: industrial Robots, robot anatomy (structure) and robot configuration, robot drive and control systems, robot sensors, robot applications.

IPE 410: CAD/CAM Sessional (0.75 credit hours)

Sessional work compatible to course no. IPE 409.

IPE 411: Industrial and Business Management (3 credit hours)

Business and management process, managerial function of business and then relative importance, managerial skills and development.

Emergence of management thought and the patterns of management analysis scientific management and Taylor's Principle, modern operational-management theory, emergence of the behavioral sciences, recent contributors to management thought.

Management and society: the external environment, social responsibility and ethics.

Organization and management: system approach to organization, organization theory and organizing practices, basics of organizing.

Personnel and human resource management in business, human factors and motivation, leadership, group decision making and communication, job gradation, process of performance appraisal and reward systems.

Managing information for decisions and management information systems.

Management in operations and business: systems approach to operation management and business, managing the marketing of goods and service, total marketing activity, marketing mix, some selected topics of marketing such as industrial and consumer selling, advertising, new product strategy and decisions.

Management in the international selling, management revisited and challenges for management in the twenty first century.

IPE 451: Supply Chain Management (3 credits hours)

Introduction to supply chain management: supply chain, systems approach to management, materials management, major areas of supply chain management, forward and backward linkage.

Materials planning: role of forecasting, market demand estimation.

Procurement management: procurement cycle, materials sourcing, vendor evaluation and selection, make-buy decision, multi-criteria decision, making in supplier selection, negotiation, transportation, logistics, incoming materials inspection.

Inventory systems management: different types of product structures for materials planning, management of raw materials, work-in-process (WIP), finished good and spare parts inventories, lead time management, cycle time reduction.

Stores management: stores layout planning, addressing systems, codification systems, traceability, physical verification and counting, surplus and waste management.

Physical distribution: network planning, packaging, materials handling, carrier systems, distribution inventory, legal aspects and common rules of transportation.

IPE 470: Industrial Simulation Sessional (0.75 credit hours)

IPE 480: Business Communication Seminar II (0.5 credit hours)

5.2 COURSES OFFERED TO IPE STUDENTS BY OTHER DEPARTMENTS

Math 191: Differential and Integral Calculus (4 credit hours)

Differential calculus: limit, continuity and differentiability, differentiation of explicit and implicit functions and parametric equations, differential, Successive differentiation of various types of functions, Leibniz's theorem, Roll's mean-value theorems, Taylor's theorem infinite and infinite forms, Maclaurin's theorem in finite and infinite forms, L'Hospitals rule. tangent and normal, sub tangent and subnormal in Cartesian and polar coordinates, partial differentiation, Euler's theorem maxima and minima for functions points of inflection, applications, curvature, evaluation & involutes asymptotes, envelopes, curve tracing.

Integral calculus: integration by parts, integration by the method of substitutions, standard integrals, integration by the method of successive reduction, definite integrals, kits properties and uses, Wally's formula, improper integrals, beta function and gamma function, area under plane curves in Cartesian and polar coordinates, area of the region enclosed by two cures in Cartesian and polar coordinates, arc-lengths of curves in Cartesian & polar coordinates, parametric, pedal and intrinsic equations, volume of solids of revolution, volume of hollow solids of revolution by shell method, area of surface of revolution.

Math 193: Vector, Matrix and Co-ordinate Geometry (4 credit hours)

Vectors: definition of vectors, equality of vectors, addition, subtraction and multiplication of vectors, scalar and vector product of two vectors and their geometrical interpretation, triple products and multiple products and their application to geometry and mechanics, linear dependence and independence of vectors.

Matrix: definition of matrix, different types of matrices, algebra of matrices, adjoin and inverse of a matrix, rank and elementary transformations of matrices, normal and canonical forms, solution of linear equations, quadratic forms, matrix polynomials, Eigen values and Eigen vectors.

Co-ordinate geometry: transformation of co-ordinates & identification of conics three dimensional co-ordinate system projection direction cosines, equations of planes and lines angle between lines and planes, distance from appoint to a plane, coplanar lines, shortest distance between two given straight lines, standard equations of sphere, ellipsoid, hyperboloid of one sheet, hyperboloid of two sheets, tangent planes, normal lines, condition of tangency.

Math 291: Different Equation, Vector Calculus and Laplace Transform and Co-Ordinate Geometry (3 credit hours)

Ordinary differential equation: formation of differential equations, solution of first order differential equations by various methods, solution of general linear equations of second and higher orders with constant coefficients, solution in series by Frobenious method, Bessel function, legendry polynomials and their properties.

Vector calculus: differentiation and integration of vectors together with elementary applications, line, surface and volume integrals, gradient of a scalar function, divergence and curt of a vector function, physical significance of gradient, divergence and curt, Gauss's theorem, Stocke's theorem, Green's theorem and their applications.

Laplace transform: definition of Laplace transform, elementary transformation sand properties, convolution, solution of differential equation by Laplace transform, evaluation of improper integrals by Laplace transforms.

Phy 102: Physics Sessional (1.5 credit hours)

Sessional based on Phy 105 and Phy 117.

Phy 117: Structure of Matter, Electricity and Magnetism, and Modern Physics (3 credit hours)

Structure of matter, states of matter, solid, liquid and gas, classification of solids: amorphous crystalline ceramics & polymers. Atomic arrangement in solids, different types of bonds in solids, metallic, Vander Waals, covalent and ionic bond, packing in solid, inter atomic distances and forces of equilibrium, x-ray diffraction,

Bragg's law, plasticity and electricity, distinction between metal insulator and semi-conductor.

Electricity and magnetism: electric charge, Coulomb's law, the electric field, calculation of the electric flux and Gauss's law, some application of Gauss's law, electric potential V, relation between E and V, electric potential energy, capacitors, capacitance, dielectrics and atomic view, dielectrics and Gauss's law: current and resistance, current and current density, Ohm' law, resistivity, an atomic view, Ampere's law, Faraday's law, Lenz's law, self inductance and mutual inductance, Magnetic properties of matter: magneto-motive force, magnetic field intensity and permeability, susceptibility, classification of magnetic materials, magnetization curves, modern physics.

Michelson Morley's experiment, Galilean transformation, special theory of relativity, Lorenz transformation, relative velocity, length contraction, time dilation mass-energy relation, photo-electric effect, Compton effect, de Broglie wave, Bohr's atomic model, radioactive decay, half life, mean life, isotopes, nuclear binding energy, alpha, beta, gamma decay.

Phy 163: Waves & Oscillations, Geometrical Optics and Wave Mechanics (3 credit hours)

Waves & oscillations: differential equation of a simple harmonic oscillator, total energy and average energy, combination of simple harmonic oscillations, Lissajous figures, spring- mass system, calculation of time period of torsional pendulum, damped oscillation, determination of damping co-efficient, forced oscillation, resonance, two-body oscillation, reduced mass, differential equation of a progressive wave, power and intensity of wave motion, stationary wave, group velocity and phase velocity, architectural acoustics, reverberation and Sabine's formula.

Geometrical optics: combination of lenses: equivalent lens and equivalent focal length, cardinal points of a lens, power of a lens: defects of images: spherical aberration, astigmatism, coma, distortion, curvature, chromatic aberration, optical instruments, compound microscope, polarizing microscope, resolving power of a microscope, camera and photographic techniques.

Waves mechanics: principles of statistical physics, probabilities, classical statistics, quantum statistics, base-Einstein statistics, Fermi-

direct statistics and their application, fundamental postulates of wave mechanics, time dependent Schrödinger equation, Schrödinger equation for one-electron atom and its solution.

Reflection, transmission and intensity of sound waves, variation of sound intensity with distance, units of sound intensity: decibel and other units, Doppler's principle.

Light: illumination and photometry, luminous intensity, their measurements and units, phosphorescence, fluorescence, discharge lamps, theories of light: interference: Young's double slit experiment, determination of thickness of a film, diffraction: diffraction due to a single slit, polarization: different methods of polarization, intensity of polarized light.

Heat: humidity, vapor pressure, temperature related humidity, transmission of heat: conduction, conductivity, rectilinear flow of heat, determination of thermo-conductivity of good and bad conductors, heat flow through compound walls, convection, free and forced convection, domestic and industrial applications, ventilation, radiation, different laws of radiation, black body radiation, radiation from surfaces, solar radiation.

Chem 119: Chemistry-I (3 credit hours)

Modern concepts of atomic structure, advanced concepts of bonds and molecular structure, crystal structures, modern periodic table, chemistry of transition metals, properties and uses of noble gases, acids and bases, chemistry of solutions, properties of dilute solutions, chemical equilibrium, thermo chemistry, electrochemical cells, ionization of water and ph, chemical kinetics, phase rule and phase diagrams, selected topics on organic chemistry, introduction to organic polymer, basic concepts of dyes color and constitution.

Chem 114: Inorganic Quantitative Analysis Sessional (1.5 credit hours)

Volumetric analysis: volumetric analysis: acidimetry-alkalimetry, titrations involving redox reactions, determination of Cu, Fe and Ca volumetrically, complexometric titration, determination of Ca, Mg in water.

Chem 143: Chemistry of Materials (2 credit hours)

Glass: classification, manufacture and application, paints, varnishes and metallic coating: composition and applications of paints, varnishes and paints, varnishes and metallic coatings, methods used in applying coating on metal surface.

Plastic: Fundamental characteristics, classification, raw materials and manufacture of plastics, some typical examples of plastics and their uses, fibers: types of fibers, synthesis and application of synthetic fibers, rubber: Source of natural rubber, chemical treatment of latex, synthesis and properties of synthetic rubber.

Lubricants: chemistry of lubricants, sources, properties, refining, chemical treatment and industrial importance of lubricants.

Hum 102: English Languages Practice Sessional (1.5 credit hours)

English phonetic: ways of correct English pronunciation, dialogue: improving speaking skill, composition: spoken composition on general topics, vocabulary: improving stock of words, listening comprehension: improving listening skill through audio-visual methods, correspondence: business communication including writing for mass media.

Report writing: writing technical report on different topics.

Hum 211: Sociology (2 credit hours)

Scope: some basic concepts, social evolution and techniques of production, cultural and civilization, social structure of Bangladesh, population and world resources, oriental and occidental societies, industrial revolution, family-urbanization and industrialization, urban ecology, co-operative and socialist movements, rural sociology.

Hum 277: Fundamental of Economics (3 credit hours)

Introduction to economics, economics and engineering, different economic systems, fundamental economic problems, basic elements of demand, supply and product market, theory of utility and

preferences, consumer's surplus, theory of production and cost, theory of the firm and market structure , optimization.

Introducing macroeconomics, national income accounting, the simple Keynesian analysis of national income, employment and inflation, savings, investment and decision making, fiscal policy and monetary policy, money and interest rate, income and spending.

Economics of development and planning.

CSE 295: Computer Programming Techniques (3 credit hours)

Introduction to number system: binary, octal, hexadecimal, binary arithmetic, basic programming concepts, program development stages: flow charts, pseudo codes, programming constructs: data types, operators, expressions, statement, control statements, single dimensional arrays, functions and program structure: parameter passing conventions, scope rules, recursion, library functions, pointers, strings, multidimensional arrays, user defined data types: structures, unions, enumerations, input and output: standard input and output, formatted input and output, file access, command line parameters.

CSE 296: Computer Programming Techniques Sessional (1.5 credit hours)

Sessional work based on course CSE 295 using C programming language.

EEE 167: Basic Electrical and Electronic Circuit (4 credit hours)

Direct current circuits: laws and theorems, DC network analysis, alternating current: AC quantities and sinusoidal waveforms, phasors, AC circuit analysis: series and parallel branches-RL, RC, and RLC balanced three-phase circuits.
Semiconductor diode: operation, characteristics and applications, introduction to bipolar junction transistors (BJTs), characteristic, common-emitter (CE), common-base (CB), common-collector (CC), and amplifier configurations.

EEE 168: Basic Electrical and Electronic Circuit Sessional (1.5 credit hours)

Laboratory experiments based on EEE 167.

EEE 271: Electrical Machines and Electronics (3 credit hours)

Single phase transformer, DC motor: principle and applications, three phase induction motor: principle and applications, introduction to synchronous motors and fractional horse power motors.

Introduction to operational amplifiers (OP-AMPs) and applications, silicon controlled rectifiers (SCR): operation and characteristics, power control using SCR, transducers: strain, temperature, pressure, speed and torque measurements.

EEE 272: Electrical Machines and Electronics Sessional (1.5 credit hours)

Laboratory experiments based on EEE 271.

ME 160: Mechanical Engineering Drawing-I (1.5 credit hours)

Introduction: instruments and their uses, first and third angle projections, orthographic drawings, isometric views, missing lines and views, sectional views and conventional practices, auxiliary views.

ME 223: Fluid Mechanics and Machinery (3 credit hours)

Fluid properties, fluid statics, basic hydrostatic equation, manometer, pressure variation in static incompressible and compressible fluids.

One dimensional flow of fluid: equation of continuity, Bernoulli's equation, fluid flow measurements, real fluid flow, frictional losses in pipes and fittings.

ME 224: Fluid Mechanics and Machinery Sessional (1.5 credit hours)

Sessional based on ME 223.

ME 243: Mechanics of Solids (3 credit hours)

Stress analysis: statically indeterminate axially loaded member, axially loaded member, thermal and centrifugal stresses, stresses in thin and thick walled cylinders and spheres.

Beams: shear force and bending moment diagrams, various types of stresses in beams: flexure formula, deflection of beams: integration and area moment methods, introduction to reinforced concrete beams and slabs.

Torsion formula, angle of twist, modulus of rupture, helical springs, combined stresses: principle stress, Mohr's circle, columns: Euler's formula, intermediate column formulas, the secant formula, flexure formula of curved beams.

Introduction to experiment stress analysis techniques, stain energy, failure theories.

ME 244: Mechanics of Solids Sessional (0.75 credit hours)

Sessional based on ME 243.

ME 245: Engineering Mechanics and Theory of Machines (4 credit hours)

Basic concepts of mechanics, force in trusses and frames, friction, centroids and moment of inertia, kinetics of particles and rigid bodies.

Mechanisms: displacement, velocity and acceleration, static and dynamic balancing of rotating components. under damped and damped free vibration of one and two degrees of freedom, forced vibrations, whirling of shafts and rotors, power transmission by ropes, bells chains, gears and gear trains, study of cams.

ME 265: Thermodynamics and Heat Transfer (4 credit hours)

Basic concepts and definitions: sources of energy: conventional and renewable, thermodynamics: fundamental concepts and laws, non-flow and flow processes, thermodynamic cycles, introduction to: steam generating units, internal combustion engines, steam turbines, gas turbines, refrigeration and air conditioning systems.

Introduction to heat transfer, modes of heat transfer, study and unsteady state heat conduction and radiation head transfer, convection heat transfer, natural and forced convection, heat exchangers.

ME 266: Thermodynamics and Heat Transfer Sessional (1.5 credit hours)

Based on ME 265.

MME 195: Engineering Materials – I (3 credit hours)

Properties of metals, ceramics and polymers, processing of materials from liquid, solid and paste, choosing materials for products, atomic, molecular, crystalline and amorphous structures for metals, ceramic and polymers, elastic and plastic behavior of materials in service: fracture, ductile-brittle transition, fatigue, creep, oxidation and degradation, corrosion and corrosion protection, materials as mixtures of elements: mixtures nears and far from equilibrium, phase diagrams, phase changes, non-ferrous metals: production and uses, iron and steel production: production and uses: types of cast iron, effects of impurities, plain carbon steel: the iron-iron carbide phase diagram, constituents and structures of plain carbon steels, head treatment of steels, alloy steels: principles and effects of alloying, different alloy steels and their uses.

MME 295: Engineering Materials – II (2 credit hours)

Ceramic: ceramic raw materials, preparation, characterization and processing, principles and mechanisms of ceramic drying and firing processing, principles and mechanisms of ceramic drying and firing process, defects and properties of ceramics: glazing and decoration,

conventional and engineering ceramics, newer industrial ceramics, glasses: kinetics of crystallization and phase separation of glass transition, viscosity, chemical durability and thermal, electrical, optical, and mechanical properties of commercial glasses, relation of physical properties to glass structure and composition, tests of glass, polymers: structure and properties of polymers and copolymers, thermoplastics and thermo sets, product design, commercial processing of polymers: properties and testing polymers, polymers and the environment, composites: theory of composites, fabrication

structure and uses of different types of composites, properties of composites.

MME 296: Engineering Materials Sessional (1.5 credit hours)

Metallographic sample preparation, micro study of ferrous and nonferrous materials, micro study of clay-based ceramic materials and semi crystalline polymers, study of the manufacturing processes of ceramic and glasses, anisotropic properties of composite materials.

Shop 160: Foundry and Welding Shop

Shop 170: Machine Shop

5.3 OPTIONAL COURSES FOR IPE STUDENTS

IPE 415: CNC Machine Tools (3 credit hours)

CNC concepts: hardware, input-output systems and interfacing in CNC machine tools.

Principles of CNC machine tool elements: actuators, feedback devices, interpolators, machine control unit, micro-electro-mechanical devices.

Control systems of CNC machine tools: point-to-point system, contouring system, adaptive control.

Case-study of a CNC machine tool.

IPE 419: Computer-Integrated Manufacturing (3 credits hours)

Role of computers in manufacturing, computer aided process planning, hardware and software components of computer automations: PLC, robots and software: automated material handling and storage systems, computer control of manufacturing systems, flexible manufacturing system, factory of the future.

IPE 421: Modern Machinery and Machining Processes (3 credits hours)

Modern machining processes: ultrasonic machining, abrasive jet machining, abrasive flow machining, orbital grinding, water jet cutting, electrochemical machining, electrical discharge machining, electron beam machining, LASER beam machining, plasma arc machining, chemical machining, working principles of the related machines.

IPE 425: Micro-Manufacturing (3 credits hours)

Micro elements: design and fabrication, basics of micro-fabrication technology: thin film growth and deposition, photolithography, X-ray, lithography, wet and dry chemical etching, electrochemical machining, ultrasonic machining, plasma machining and LASER machining.

IPE 427: Marketing Management (3 credits hours)

Marketing concepts: market orientation, relationship marketing, market segmentation and measurement, buyer behavior, marketing planning and budgeting.

Concept of marketing mix: product, price, place and promotion, Strategic and tactical decisions, new product planning processes, global marketing, case studies.

IPE 429: Technology Management (3 credits hours)

Introduction to technology, growth of technology, types and components of technology: technology and environment, technology forecasting, technology assessment, transfer of technology, technological development and planning.

IPE 445: Entrepreneurship Development and Micro Industries (3 credits hours)

Entrepreneurship: definition and importance and its role, characteristics and skills of entrepreneurs, entrepreneurial process, self-assessment, managers, leader, innovators and entrepreneurs.

Small business: nature and importance, methods for generating ideas, creativity process, product planning and development process, merger, acquisition & joint venture, business plan, marketing plan, market research, financial plan, organizational and human resource plan, production plan, financing the business, managing early operations and growth.

IPE 453: Information Technology in Business (3 credit hours)

Introduction to IT, scope and importance of IT in businesses and management, e-Commerce, m-Commerce, database management system: management information system (MIS), project management, Networking architectures: LAN, WAN, internet, intranet, extranet, Wi-Fi, Wi-Max, networking equipment, security issues in data management and networking, current trends.

IPE 461: Organizational Behavior (3 credits hours)

Behavior of individuals in organizations: values and attitudes, motivation, group and group processes: group dynamics, communication, power & conflict, organizational system: structure, job design, appraisal of performance, processes of organizational change and development.

IPE 463: Total Quality Management (3 credits hours)

TQM definition, origins and growth of TQM, benefits of TQM, philosophies of TQM: quality circle approach, Deming's approach, Juran's approach, Philip Crosby's approach.

Planned implementation of TQM: planning and commitment, participation, continuous improvement.

IPE 465: Intelligent Manufacturing (3 credits hours)

AI Technologies and expert system: components and features, knowledge system, knowledge engineer, domain expert, knowledge engineering languages.

Artificial neural network and fuzzy logic.

Expert manufacturing systems: CIM, manufacturing communication system and intelligent manufacturing, flexible manufacturing system, case study of EMS.

IPE 467: Energy Management (3 credits hours)

Energy systems: commercial-noncommercial, rural-urban, renewable-no-renewable energy, energy planning, energy generation and distribution systems management, generation mix, dispatch system energy policy: national energy policy and tariff policy.

ME 447: Robotics (3 credit hours)

Introduction to robotics, definitions, plane, rotational and spatial motion with applications to manipulators, geometric configurations: structural elements, linkages, arms and grippers, kinematics of manipulators, motion characteristics, trajectories, dynamics and control of manipulators, actuators and sensors for manipulators, application of industrial robots and programming, Tele operators, mobile robots and automated guided vehicles, special purpose robots.

ME 461: Control Engineering (3 credit hours)

Introduction to control systems and their representation by different equations and Laplace transformations, block diagrams and transfer functions, analog computer solution of system equations, system response, control action, and system types, frequency response, system analysis, system compensation, analogues of control systems, hydraulic and pneumatic control systems, elements of electromechanical controls, introduction to digital computer control.

CSE 443: Digital Logic and Microprocessor Technology (3 credits)

Logic gates, flip-flops, counters, registers, memory systems, A/D and D/A Converters, multiplexers and demultiplexers, address memory, control unit, digital system design, introduction to different types of microprocessors, microprocessor architecture, instruction set, I/O operations, interrupt structure, interfacing & interfacing ICs, micro-processor based system design.

5.4 COURSES OFFERED TO UNDERGRADAUTE STUDENTS OF OTHER DEPARTMENTS

IPE 204: Engineering Graphics and Introduction to CAD Sessional (1.50 credit hours)

Product graphics: Drafting codes as per ISO, tolerances, and dimensioning, ensuring co-auxiliary, perpendicularly, and parallelism compatible to manufacturing and assembly requirements, schematic product symbols for welding and piping systems.

System graphics: Working drawings of cumulative and non-cumulative assemblies, dimensioning of assembled parts, use of standard parts threads, fasteners, and springs, detailing of assembled parts.

CAD: Constructing geometry, transformation. Viewing and chipping perspectives, modeling: generation of curves and surfaces, and introduction to solid modeling, automatic dimensioning, and generation of bill of materials.

IPE 331: Production Process (4 credit hours)

Selection of Machining Processes.

Casting: sand, dies, centrifugal and other types of casting, casting design and casting defects.

Chipless metal forming process: different types of hot and cold working processes.

Welding: Arc, gas, TIG, MIG, resistance, thermit, and special types, brazing and soldering.

Tool geometry and chip formation processes.

Metal removing processes: turning, drilling, shaping, planning, milling broaching, grinding, precision and non precision finishing processes.

IPE 332: Production Process Sessional (0.75 credit hours)

Experiments based on IPE 331.

IPE 381: Measurement and Quality Control (3 credit hours)

Organization of inspection kinds of inspection, standards of length, scope and techniques for maintaining tolerances, grades of manufacturing accuracy, assembly selective and interchangeable assembly, gauging and limit gauges, Abbey's principle, measuring tools for angles and tapers, instruments for checking straightness and flatness and for alignment test, gear measurement of surface finish, surface roughness, electrical and electronic measurements, nondestructive test.

Frequency distribution, measures of central tendency and dispersion, concept of probability, conditional and Bayes' Theorem, probability distributions, moment and moment generating function, sampling theory, estimation hypothesis testing, acceptance sampling plans-single, double, sequential, rectifying inspection plans, control charts, S, R and C charts, regression analysis, analysis of variance, concepts of quality circle, TQM and TQC.

IPE 382: Measurement and Quality Control Sessional (0.75 credit hours)

Experiments based on IPE 381.

IPE 431: Machine Tools (3 credit hours)

Mechanical, electrical hydraulic and pneumatic drives in machine tools, bearings, slide ways, structure and control of machine tools, detailed case study of engine lathe, turret lathe, milling machine, grinding machine and gear shaping machine.

Installation and acceptance tests of machine tools.

Locating principles and locators, clamps, dies, Jigs/fixtures.

IPE 432: Machine Tools Sessional (0.75 credit hours)

Experimental based on IPE 431.

IPE 433: Metal Cutting Process (3 credit hours)

Theory of metal cutting: mechanism of chip formation, chip breaker, chip-tool contact process, type of chip.

Tool materials, tool design and manufacturing.

Theoretical and experimental determination of cutting forces, heat phenomenon, cutting fluid, tools wear and tool life, economics of metal cutting.

Gear and thread manufacturing processes.

IPE 435: Modern Manufacturing Technology (3 credit hours)

Introduction to modern manufacturing technology.

Modern manufacturing processes, electro-discharge machining (EDM), electro-chemical machining (ECM), electron-beam (EBM), LASER-beam machining (LBM), ultrasonic machining (USM), plasma are machining (PAM), abrasive jet machining (AJM) and related machines.

Protective coatings and hard facing, Modern welding processes.

Automatic and semi-automatic machine tools and automatic transfer lines.

Introduction to NC, CNC and DNC.

IPE 437: CAD/CAM (3 credit hours)

CAD: fundamental concepts, application, benefits, hardware and software, types of CAD systems, common 2D CAD software features, basic 3D CAD features.

CAM: fundamental concepts, trend of development of numerical control (NC), principles of NC, types of NC systems, types of NC machines, CNC (manual) part programming, CNC part programming using CAM software, interfacing CAM software with CNC machines, computer aided machining.

IPE 479: Engineering Management (3 credit hours)

Management: evolution of management thought, classical quantitative and behavioral schools, interactions schools, interactions between organizations and their environment.

Management principles, management functions, the management team, management by objectives.

Organizational structures, co-ordinations and spans of control, the informal organization, authority delegation and decentralization, groups and committees, managing organizational change and conflict.

Motivation, performance satisfaction, leadership, training, incentive systems, performance appraisal.

Quantitative techniques in management decision, decision making process, optimization techniques, and their applications to industrial problems.

Financial management, budgetary control, cost management and control, investment schedule, criterion of investment.

Operations management: types of production; forecasting, inventory management, scheduling, maintenance management, quality management, layout planning, management information system.

IPE 481: Industrial Management (4 credit hours)

Organization and management evolution, management functions, organization structure, development of organization theory, study of various types of organization and management information system, concepts and scope of applications.

Cost management elements of cost of products, cost centers and allocation of overhead costs, management accounting: marginal costing, standard costing, cost planning and control, budget and budgetary control, development and planning process, annual development plan, national budget.

Financial management: objectives, strategy, financing, performance analysis of enterprises, investment appraisal, criteria of investment.

Personnel management: importance, scope, need hierarchy, motivation, defense mechanism, productivity and satisfaction, leadership, group dynamics, job evaluation and merit rating personnel development-hiring, training, wage systems.

Marketing management: marketing concept, marketing organization, industrial and consumer selling, channel decisions, advertising decisions, and new product strategy.

Technology management.

Case study.

IPE 483: Production Planning Control (3 credit hours)

Elements of production planning and control, types of production system.

Forecasting methods and their application, aggregate planning, master production scheduling, MRP, coding and standardization, capacity planning, inventory management, ABC analysis, production scheduling techniques, CPM and PERT, line balancing capacity planning, plant location and layout, work study and method study, plant performance measurement introduction to product development and design.

Computers in production planning and control and MRPII, JIT.

IPE 485: Operations Research (3 credit hours)

Introduction, linear programming (simplex and transportation model), Network analysis dynamic programming, introduction to simple queuing models, introduction to probabilistic inventory models, game and decision theory, simulation integer programming, scheduling, and reliability.

IPE 487: Material Handling (3 credit hours)

Material handling importance and scope of material handling, classification of materials, unit load and bulk loads, analysis of material handling problems, system concept, selection and classification of conveying equipment, efficiency of material handling systems, general theory of conveyors, computer control

material handling (AGV, ASRS etc.), description and design of belt, chain, screw, pneumatic and hydraulic conveyors, operation and selection of industrial truck loads.

Packaging: packaging materials, layout for packaging.

Testing procedure of packages: vibration test, drop test, performance limit and testing machines.

Storage and warehousing sorting, warehousing.

IPE 489: Engineering Management (4 credit hours)

Management: evolution of management thought, classical quantitative and behavioral schools, interactions schools, interactions between organizations and their environment.

Management principles, management functions, the management team, management by objectives.

Organizational structures, co-ordinations and spans of control, the informal organization, authority delegation and decentralization, groups and committees, managing organizational change and conflict.

Motivation, performance satisfaction, leadership, training, incentive systems, performance appraisal.

Quantitative techniques in management decision, decision making process, optimization techniques, and their applications to industrial problems.

Financial management, budgetary control, cost management and control, investment schedule, criterion of investment.

Operations management: types of production; forecasting, inventory management, scheduling, maintenance management, quality management, layout planning, management information system.

Project management.

Marketing management: concepts, sales and marketing strategies.

Case studies.

IPE 491: Engineering Management (3 credit hours)

Introduction: evaluation and various thoughts of management principles, need functions, organization and environment.

Organization: theory and structure, coordination, span of control, authority delegation, groups, committee and task force, manpower planning.

Personnel management: need hierarchy, motivation, leadership, performance appraisal, wages and incentives, informal group, organizational planning change and conflict.

Operations management: types of production, forecasting, inventory control, scheduling, maintenance management, using conventional and analytical techniques, safety management, quality management, manages of performance, work measurement, management information System, location and layout of plant need facilities.

Cost and financial management: elements of costs of products, depreciation, break-even analysis, investment analysis, budgetary control, benefit-cost ratio.

Marketing management: concepts, sales and marketing strategies, patents laws.

Technology management: management of innovation and changes, technology life cycle, Hi-tech management.

Case studies.

IPE 493: Industrial Management (3 credit hours)

Management functions and organization: Evolution, management function: organization, theory and structure, span of control, authority delegation, manpower planning.

Personnel management: importance, need hierarchy, motivation, leadership, wage incentives, performance appraisal, participative management.

Operation management: production planning and control (PPC) functions, quantitative methods applied in production, quality management, location and layout planning safety and loss management.

Cost and financial management: elements of cost of products, cost analysis, investment analysis, benefit-cost analysis, risk analysis.

Management accounting: cost planning and control, budget and budgetary control.

Marketing management: concepts, strategy, sales promotion, patent laws.

Technology management: management of innovation and changes, technology life cycle.

Case studies.

Chapter 6

STUDENT ACTIVITIES OF THE DEPARTMENT

6.1 INTRODUCTION

To make the students compatible with the recent trend, department of Industrial and Production Engineering (IPE) always encourages extracurricular activities as a part to enhance the capability of the students. Department of Industrial and Production Engineering believes through extracurricular activities students can grow some outstanding qualities like team camaraderie, working under pressure, self-confidence and many more. Students of this department are always enthusiastic about arranging many programs to enhance their academic and as well as professional career. To augment their activities, students of this department have formed an association named Association of Industrial and Production Engineers (AIPE) which was established in 1998 with a view to familiarize and focus Industrial and Production Engineering in Bangladesh. AIPE with its members who are basically the students, faculties, graduates of the department and professionals in the field of Industrial and Production Engineering arrange many programs like career talk, workshops, seminars, IPE day to make the positions of Industrial Engineering strong in our country.

6.2 ANNUAL ACTIVITIES

IPE DAY

Every graduating batch of the department organizes a very intensive event named IPE day under the banner of Association of Industrial and Production Engineers (AIPE) and with the help of department of IPE.

In this event, usually seminars on burning issues of different business sectors of our country take place where the leading industries of the receptive sectors' participate. This event not only tries to mitigate the gap between the industries and the university but also creates a great platform to open new gates for IPE graduates.

Inauguration Ceremony of IPE Day

Respective Guests on the Auspicious Moment of IPE Day.

SEMINARS AND WORKSHOPS

Students of the department organize many seminars and workshops throughout the year with the help of the teachers and alumnae to improve their knowledge in different fields. In this regards many industries of our country help the students to organize these programs by sharing their resources.

Career Development Workshop.

Workshop Organized by IPE Department.

PICNIC

Almost every year the students of the department organize a whole day long picnic to get a refreshing break from their daily academic life and to strengthen the bond between everyone. Teachers, students, alumnae participate in the picnic to enjoy to their fullest.

Students are Enjoying on a Picnic Day

Friendly Cricket Match Between IPE Students and IPE Alumni

6.3 MAJOR ACHIEVEMENTS OF THE STUDENTS

Project D Youth

Project D Youth Champion Team

A group of eight students of IPE from batch 2001 achieved the first position among 773 teams in a business competition named Project D Youth organized by Grameen Phone and Project Bangladesh in 2007.This competition was held in different stages where this team had to win in every steps and finally had to beat the team from IBA (MBA), in the final to secure the first position.

Battle of Minds


Second Runners Up Team of Battle of Minds

A group of four students where two of them were from department of IPE of batch 2005 achieved the position of second runners up in the most prestigious university competition named Battle of Minds organized by British American Tobacco Bangladesh Limited in 2009. Battle of Minds is a competition for the young students aimed to provide a platform for the talented individuals to display their entrepreneurial wisdom and have an experience about what it takes to be on the lead of business world.

Debate Competitions

IPE Student Participating in Baroari Debate

Students of the department of IPE have always stepped towards a great success in different debate competitions held nationally and internationally. One of the students of the department from batch 2005 achieved the championship prize of Baroari debate in 2007 organized by BTV and in 2009 organized by ATN Bangla. The same student of the department of I.P.E. also got an opportunity to participate in 3rd South Asia Youth Festival 2008 held in Nepal.

CITI IT Case Competition

Second Runner Up Team of CITI IT Case Competition With Honorable Vice Chancellor

A BUET team consists of four students where two of them were from IPE department achieved 2nd runner up position in second CITI IT Case competition in 2010. In this competition 11 teams were selected for the final round out of 54 teams from different public and private universities. The project name was Virtual Money Transaction contained the idea of Mobile Cash which is accessing the money stored in bank account through mobile and using it to purchase daily necessities.